

**COOP'S
SATELLITE
DIGEST**

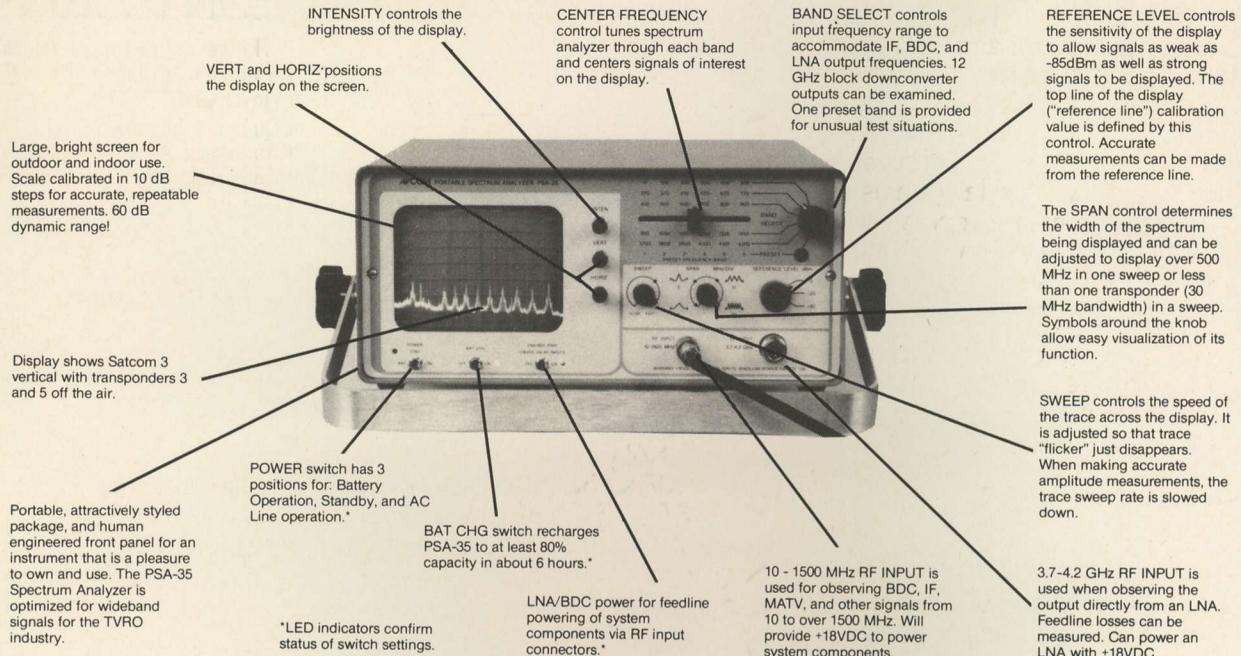


MAY 01, 1985

INTERNATIONAL EDITION

AVCOM's PSA-35 Portable Spectrum Analyzer

Designed with you in mind— Basic enough to begin with— Sophisticated enough to grow with!



KEYWORD EXPLANATIONS

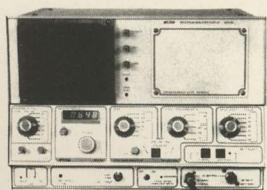
SPECTRUM ANALYZER — an instrument used to display signal amplitude vs. frequency over a selected range of frequencies (bandwidth). Amplitude is shown by the height of the trace on the screen.

REFERENCE LEVEL — in our context, a line at the top of the display that defines signal level at that point. Equally spaced lines below it at 10 dB intervals enable easy readout of various signal levels.

dBm — the most useful unit of measurement of signal strength (power) for our industry. It means decibel referenced to 1/1,000 of a watt of power. The following list will help you put dBm values into perspective:

- +20dBm — 100 mw (1/10 watt)
- +10dBm — 10 mw (1/100 watt)
- 0 dBm — 1 mw (1/1,000 watt)
- 10dBm — .1 mw
- 40 dBm — .0001 mw (typical BDC output)
- 70 dBm — typical 4 GHz feedline signal

FOR DEMANDING BENCH-TEST SITUATIONS, AVCOM'S MSA-85 SPECTRUM ANALYZER



- Digital Frequency Readout
- Accurate Enough for Production and Lab Use
- Built-in DC Block and Power for LNA
- Sophisticated Styling
- Reliable Design

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AVCOM's PSA-35

**THE MOST VALUABLE TEST INSTRUMENT
YOU CAN BUY FOR INSTALLING
AND SERVICING TVRO SYSTEMS!!**

TOP OF THE MONTH

SMATV — another approach. Back in our October and November 1983 issues we reported on a system developed by TX Engineering to cable distribute 450-950 range block IF signals to homes over a wide area. **David Lantz** updates us on the engineering progress with such systems and provides much needed assistance for any BDC distribution system planner.

IQ-160 polarization problems? Can't find technical help? Or perhaps you want to introduce satellite TV to an entire country but don't know where to start? Maybe mini-SMATV is 'your thing'; it's all here, this month.

DESCRAMBLER interfacing has received plenty of attention in recent weeks and as the industry begins to focus on the REAL descrambler requirements, it is time to understand what the would-be scrambled uplinkers are saying to us when they request certain receiver specifications for 'descrambler compatibility'. We try to sort that out, as well, in this issue.

FALL out from the Las Vegas show (see CSD/2 for April 15th) is still settling down on the ground. Coop comments on some of the fall-out as well as some of the things you may have overlooked in Vegas.

COOP'S

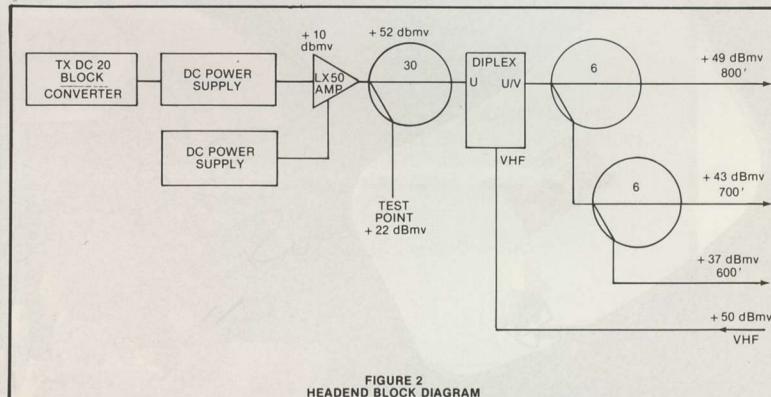
SATELLITE
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MAY 01 1985

COOP'S COMMENTS page 4
SMATV-CTN SYSTEM ENGINEERING/ David Lantz page 8

FIGURE 2
HEADEND BLOCK DIAGRAM

THE HALF-GALAXY THEORY/ Peter Sutro page 22
DESCRAMBLER INTERFACING/ Alli Lake page 23
COSTA RICA TVRO/ Jan Spisar page 35
TECHNICAL TOPICS/ IQ-160 + Omni Solution page 48
CORRESPONDENCE page 50
TRANSPOUNDER WATCH page 71



OUR COVER/ Industry media-star **Shaun Kenny** (Boresight TV program) directs on the 'set' in Vegas as CSD's **Dr. Carol Rosin**, and **Jim Miller** of **Home Satellite TV Magazine** prepare to tape for a piece airing on Boresight May 9th.

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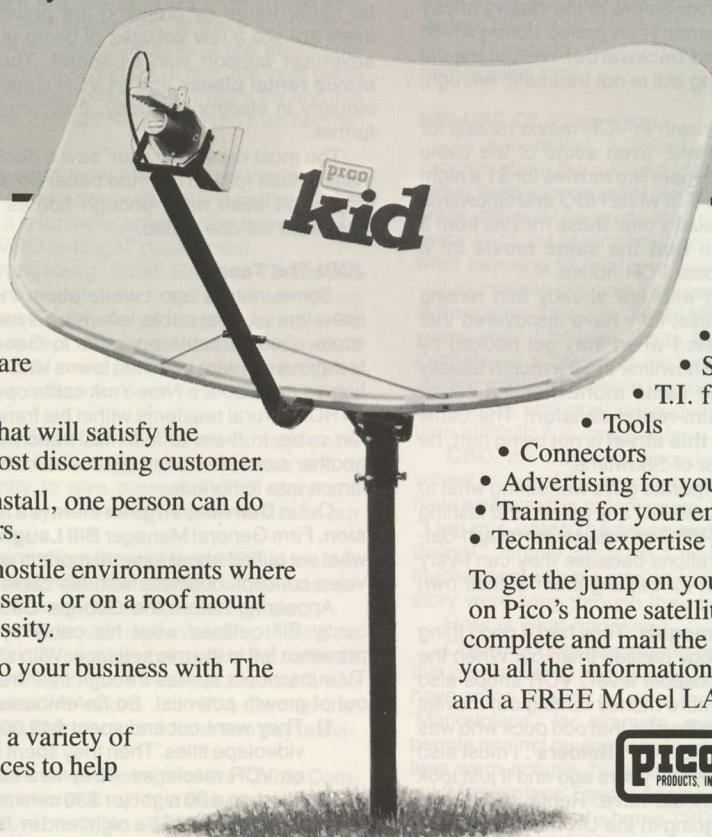
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COOP'S SATELLITE COMMENT

- LAS VEGAS Re-Visited
- BIGGER SHOW Locations?
- DESCRAMBLER Reaction

NO MORE Growth?

Well, it's over. **Cable has stopped growing** at its record breaking pace and there has ever been a 'decline' in the most recent quarter. As you may well suspect, there is plenty of teeth gnashing and wringing of hands over all of this.

Cable began experiencing problems about 18 months ago. The rate of growth started to falter and first hit were the premium programmers; HBO in particular. The bright people at HBO decided the problem was related to 'inept marketing' and 'inept programming' so they revamped both departments. After the shakeout, which saw perhaps 200 key people leaving HBO, they stood back and took measure again. **The downward trend was still going on.**

Then the people at Showtime/The Movie Channel recently admitted that their own growth was also slowing down. In fact, they revealed, there were even declines. Never before in the history of pay cable has there been a 90 day (or quarter year) period during which the subscriber count actually **marched backwards!** Well, it just did and if growing slower, or even standing still is not traumatic enough, going backward is a heartstopper.

Showtime folks blame the rapid growth in VCR movie rentals for the decline. As we note elsewhere here, even some of the cable operators are discovering how much people like movies for \$1 a night and what everyone seems to forget is that while HBO and Showtime may show some great movies, they usually offer these movies from 3 to 6 months (or more) **after you can rent the same movie** for a modest one or two night fee at the local VCR house.

Cable operators I have talked to who are already into renting movies tell me that they could care less; they have discovered that '**yes, people do drop Showtime**' (etc.) when they get hooked by renting movies, BUT, a guy dropping Showtime at \$9 a month usually ends up spending **\$30 to \$50 in the same month** renting newer movies from the cable firm's VCR **film-rental-division!** The cable operator who is working both sides of **this street** is not being hurt; he is actually being helped by the format of Showtime.

So there sits Showtime or HBO corporate guys wondering what to do next. They are mad, 'not going to take this any more', and lashing out in all directions at once. They find TVRO an easy target to lash-out at and we get the brunt of their frustrations because they can't very well haul VCR rental places into court for beating them at their own game.

I feel sorry for these big movie moguls. They had a good thing going and then progress and technology passed them by. When the prices on VCRs dropped to the 'disposable level', VCR shops also discovered that they could make far more money renting out movies for \$1 or \$2 a night then sitting there waiting for that odd duck who was willing to shuck over \$49.95 or \$79.95 to 'own' **'Raiders'**. I must also note that the British discovered this several years ago and it just took longer to cross the Atlantic than it should have. Rental VCRs and rental movies are the hottest things going in the UK these days and you can rent movies in every conceivable type of store you can imagine; even from push carts!

Is HBO doomed? Probably not, but they are going to have to speed up their trend to shift to more and more of their own product; movies and mini-series which THEY control because they own the rights to these creations. They have another hurdle coming as well;

their present pricing schedule of \$9 to \$10 a month is going to have to come down, perhaps rapidly, because people are starting to figure out that paying \$9 for HBO versus paying \$9 for the basic service (which consists of 20 to 30 channels alone) is not such a good deal after all.

Big changes are coming and through all of this HBO and Showtime are trying to find enough time to sort out the 'home-TVRO-selling' scenario. There is a very simple solution to HBO's problems, Showtime's problems, and this insane farce called scrambling. It is a concept who's time has come. And what might that be?

HBO and Showtime and their affiliated services should forget scrambling and '**go free**'. Just give up the pretense of being premium because two years from now they won't be premium anything. And to pay their way?

Take on advertising of course. They would build themselves a far better future by dropping the pretense of being premium while there are still a few vestiges of being premium left, and switching to advertiser support with all speed. **They can't compete with the movie rental places** and as VCR continues to be the fastest growth industry in electronics today, their present position can only erode further.

The most recent 'quarter' saw a decline in net homes reached by the premium folks. They had better do something **now** to stop that or they won't even have enough homes left to make an advertising supported service viable.

JOIN The Team

Some months ago I wrote about the early efforts of some of the operators of rural cable television systems to join our industry. We wrote about a cable operator in Georgia who was using SMATV techniques to wire up small towns with fewer than 200 potential cable homes and about a New York cable operator who had begun to offer TVROs to rural residents within his franchise area, in lieu of having to run cable to them to fulfill his franchise requirements. Comes now another example of an aggressive cable operator who has turned a lemon into lemonade.

Out in **Danville, Virginia** there is a firm called **Piedmont Cablevision**. Firm General Manager **Bill Laughinghouse** has done precisely what we talked about several months ago; he has gone into the 'total video concept' business with his cable TV operation.

Appearing before the Georgia Cable Television Association recently Bill outlined what his cable system has done to make its presence felt in the marketplace. With slightly more than 22,000 cable TV subscribers spread through their franchise territory, they had run out of growth potential. So he embarked on a two-point program:

- 1) They went out and spent \$42,000 to acquire more than 1,200 videotape titles. Then they spent some more money to stock up on VCR machines. They rent out the VCRs at \$1 a night but insist on a 30 night (or \$30 minimum) agreement. They rent out movie titles at \$1 a night and in January took in \$8,000 in rental income.
- 2) Then they placed advertisements in the local papers for 'renting' satellite dishes. They limit the rental offer to homes located outside of their cable franchise area and outside any other franchises in their region. In other words, a home located where cable is available **cannot rent**; from them. They charge

\$39.95 for a Galaxy-1 only 'stationary dish' system per month or \$59.95 for the ten foot, motor drive system.

Gambling, Laughinghouse ordered in 100 dish systems and found that virtually all of the demand was for the \$59.95 a month ten foot motor driven systems. Initial response to his advertising was overwhelming; they had 450 customers call or walk in for those 100 dishes!

He has quit advertising the dishes because business is so good he can't keep up with the demand. There is no installation fee BUT there is a \$150 'removal charge' when a renter terminates the agreement, and a \$150 additional charge for terminating the 12 month rental agreement prior to 12 months. The last \$150 fee is pro-rated and if a person terminates **after** 12 months, he owes no termination fee.

Let's see. \$59.95 a month for 12 months is **\$719.40**. On top of that he offers a service contract at between \$10 and \$15 a month to keep the equipment running (most people take it). So he has \$840 or so to 'play with' that first year on a 10 foot dish system.

True to the world of high finance and skilled accounting, Laughinghouse has figured out that he can depreciate the original cost of the system and remove that depreciation from his tax schedule. So in addition to taking in \$840 or so in cash, he is moving a very similar number off of his tax schedule by taking the year's depreciation on the equipment. TVRO equipment can be depreciated in three years we understand.

That brings him more than \$1600 a year to work with **per system**. He generously offers to 'sell' the system to the renter at the end of three years. He will have taken in more than \$2500 at that point and he will have moved 80% of his original installed cost from a capital expenditure to a depreciation column on his books. That says that even if he gives the system away for \$1 at the end of three years, **he has benefitted by approximately \$4,500.**

The results so far? "**People are going crazy over these systems; we can't install them fast enough!**". Is there a message here? Perhaps it is time for **you** to spend \$200 for a few hours time with a local CPA and tax advisor. If you don't do it first, the local cable guys may figure out that Bill Laughinghouse is crazy like a fox and join the fun. It is time to stake out your own turf before the land rush begins.

HBO'S Other Side

I'd like to have a dime for each time I have typed those magic letters '**HBO**' on my keyboard. I'd be a rich man. HBO is getting a lot of press these days and some of it is far more enlightening than what we are force-fed through their 'TVRO-is-Illegal' department.

For example, out of the Orangeburg, South Carolina **Times and Democrat** business section for a recent date comes a well done piece researched by staff writer **Maura Couch**. As you might suspect, **HBO** PR people don't talk with me except in guarded tones. They would rather I didn't write about them and I could probably manage to work a deal where they would send me a dime for each time I did NOT write '**HBO**' in these pages.

Maura however approached them from a different vantage point. She wanted to prepare a report for her newspaper readers and to **HBO** this meant the opportunity to give present TVRO users and would-be users a different kind of hype-line than they tend to send **our way**. It went like this.

"Both companies (**HBO** and Showtime) have YET to decide whether or not they will provide individual dish owners with the necessary equipment to decode the soon-to-be scrambled signals.

"And even if they do make the equipment available, there's no guarantee the decoders will work on all makes of dishes (**i.e. with all makes of receivers; Ed.**) according to Mark Medress, assistant vice president of the California based M/A-Com, Inc. M/A-Com is the satellite dish decoding equipment manufacturer for the two pay television companies."

Maura explains, correctly, that since passage of the 'Cable Communications Act of 1984' it is not a violation when a dish owner tunes in a **non-scrambled** transmission via satellite. And she adds that the movie channels are but a 'portion of' the 'several hundred channels available' on satellite.

She quotes Tolo Murphy of Showtime/The Movie Channel with: "We're now concentrating on getting our signals scrambled by the third quarter of this year. We also have a task force looking into whether or not it would even be feasible to serve the backyard dish market."

"The problem with supplying decoding equipment to every dish owner is cost; decoders cost several hundred dollars apiece, which would mean a big investment for the pay TV channels. Showtime just does not have an answer at this time."

According to Maura both firms said that their primary concern was the 'commercial use' of satellite signals; where motels and apartments and the like were putting in dishes, receiving the signals, and then charging (directly or indirectly) for their use. Of course the first court case to come down in this area, as noted in **Transponder Watch** last month, was in South Texas where a motel was zapped with a big fine because it had elected some time ago to install its own dish rather than take the pay services offered by the local cable company.

Maura concluded "Both **HBO** and Showtime will continue to study various ways to offer a scrambled signal directly to the private homes but they are not sure they can come up with a way for the additional revenue to cover their costs." Of course what they are **REALLY** saying here is that as long as they are 'wed to' a distribution system that sells all such service agreements through local cable firms, **and as long as the cable firms mark-up the charges for their own profit**, the total charges are so great that it is no longer attractive to most private TVRO owners to pay the tab for **HBO** et al. In effect, they price themselves right out of the marketplace.

Truth is difficult to find in this entire scenario because the truth changes each day and more unfortunately, there is a corporate line at **HBO** for each category of listener/reader. **HBO** assigns a guy named **Ed Horowitz** the task of getting on CNN and screaming that we are all 'pirates' while at virtually the same time we find **another HBO person** on another channel telling us that they 'want to do business with home systems'. And intermingled with these diverse statements we have yet third **HBO** parties telling business writers such as Maura Couch that they really haven't sorted it all out yet. I think Maura got the answer that comes closest to 'the truth'.

Let's see: 11 times \$.10 is \$1.10. I'll expect the check from **HBO** in next week's mail.

MIS-USE Of Journalism

As a journalist, a skilled journalist, I have a deep and abiding concern about the mis-use of the so-called 'power of the press.' One has to keep a loose set of standards when talking about mis-use of the press, either by the press itself or by people who manipulate the press, since each set of circumstances varies the events which are somewhat tempting to twist and thereby cause 'mis-use' of the press.

Journalists mis-use their power all of the time. Not all 'mis-use' is evil because if it were, "**Sixty Minutes**" would have folded years (and years) ago. I believe it was **David Brinkley** who recently said "A journalist is a citizen of the world; he has no politics, owes no allegiance, speaks no single language." It is difficult to be unbiased about everything, and totally objective in **every** situation. It is probably more than difficult; it is impossible.

CBC, the Canadian Broadcasting Corporation, recently was involved in one of the most flagrant mis-uses of the power of the press I have witnessed in recent years. This one jumped out at me screaming "**I am mis-using the press and I dare you to call me on what I am doing!**" largely because I instantly knew from my own personal involvement with the story in question that these people producing this story were lying through their teeth.

Here is what happened.

CBC produces something called '**Marketplace**.' The purpose of this program is to inform people about events in real-time which may have some bearing on what they buy, use, and do with their money. '**Marketplace**', for example, might consider it appropriate to warn people against buying recapped tires if they discovered that recapped tires were actually being made from 'used' prophylactics.

'**Marketplace**' used a segment to warn Canadians, all Canadians, that the purchase of a home TVRO was 'foolish' and 'ill-advised.' They based their conclusion on a statement provided by a spokesperson appearing in the taped segment from **HBO**; you remember **HBO** ('**Honest Box Office**')? The **HBO** spokesperson told the audience "**Within sixty days ALL satellite transmissions on ALL satellites will be scrambled; the sky will go dark!**".

THE NEW DX ANTENNA POSITIONER.

Everything
you expect from
the leader.

ANTENNA BY PARACLIPSE

Finally, there's a totally integrated home satellite reception system, with perfectly matched components that look great and work beautifully together. And it's from DX, with all the quality features and superior performance you've come to expect from us. Result: the picture-perfect system you've been looking for.

The New DSB-400 Antenna Positioner

Incorporating advanced micro-computer technology, it delivers out-of-this-world features at a down-to-earth price. Features like 24 fully programmable satellite positions;

single chip circuitry for higher reliability; fully programmable polarization and skew adjustment on every satellite ... every position; and a nonvolatile 10-year memory so you don't have to leave it turned on or worry about power failure. It has easy-to-use and easy-to-read controls, programmable limits, and a full-function remote control unit with parental-supervision button. Last but not least, it looks great!

The DSB-700 Receiver

It has the DX quality features you've looked for, but for much less than you'd expect to pay. **Block down-conversion**, for multiple-TV hook-up;



picture quality comparable to commercial receivers; and a video clamp/unclamp switch with composite baseband output for descrambler compatibility. And that's not all! It's capable of receiving both 4 GHz and 12 GHz signals and comes with infrared remote control. And guess what? It looks great, too. DX also pro-

vides a full line of accessories to make for easy multiple-TV installation. From every standpoint—quality, performance, price—we've got what you've been looking for.



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SMATV & CTN BDC SYSTEM ENGINEERING

Block-downconversion satellite receivers have evolved from the early commercial high-price models to the present variety of low-cost units. The type of installation using the lower cost blockconversion receivers also differs. Prior to the introduction of 450 MHz to 950 MHz BDC receivers (1), the common way to provide satellite television and local VHF signals to multiple living units was with a rack of receivers, modulators and VHF amplifiers located at the SMATV headend. Since most major signal originators will deal only with SMATV systems of greater than 200 units, a market has developed using the lower cost BDC receivers in cooperatively owned systems. A network may be formed using a single satellite antenna and block-downconverter to feed BDC receivers located in each home. The local VHF signals are distributed in the 50 MHz to 300 MHz band with the block of satellite signals distributed through the same cable in the 450 MHz to 950 MHz band. The theory is as simple as the advertisements that promote it but the application of the theory requires further analysis.

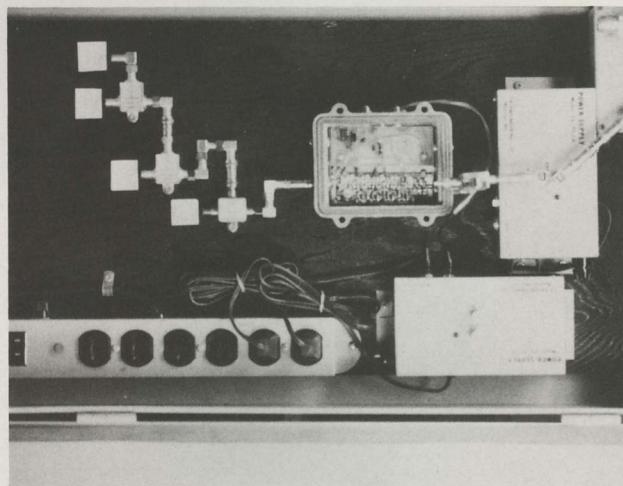
TX Engineering has been in the business of design, manufacture, and installation of Community Television Networks in the Pacific Northwest since 1982. Each network provides the community with local VHF signals and blockconverted 430 MHz to 930 MHz satellite signals. The experience gained from initial installations resulted in a thorough re-evaluation of existing UHF distribution equipment. The early test results provided in this article initiated the design of equipment **specifically for** the distribution of block-downconverted satellite signals.

I have followed the technical articles that have appeared in **CSD** since 1981 when I moved from an engineer in the aero-

Lantz begins a multiple part series in this issue of **CSD** addressing the design and limitations found in block downconversion signal distribution for the 430 (450) to 930 (950) MHz band. Lantz has been the engineer behind the **TX Engineering** Community Television Network system which **CSD** first described in October and November of 1983. He has created more UHG BDC systems, serving as many as 250 outlets, than perhaps all other engineers in this field combined. In part one, he begins by addressing the headend system. In future segments he will take you step by step through the distribution plant and to the final subscriber 'drop.'

by

David L. Lantz
Network Communication Services
16134 128th Ave. S.E.
Renton, Wa. 98055
(206/271-5636)



A RECENT CTN headend designed to mount directly at the rear of the TVRO antenna. This headend was designed to feed three separate distribution 'trunks' of 600 feet, 700 feet and 800 feet; diagram of trunk system appears in figure 2.

space industry to an entrepreneur in the TVRO industry. I highly recommend the reader review the six part series of articles on SMATV that first appeared in the **CSD** February, 1984 issue. A good understanding of the theory and practices employed in conventional "cable TV" will allow the reader to better understand the special treatment given to distributing block-downconverted signals.

BDC distribution equipment, network design considerations and installation methods are subjects for the following technical article. The task of networking VHF and BDC signals shall be separated into two categories; the Network Headend, and the BDC Distribution System.

THE CTN Headend

It is the purpose of the headend to receive both the MATV VHF signals and the block of satellite transponders, amplify the BDC signals, combine the MATV and BDC signals, and direct the signals to each BDC receiver in the network. No two CTN headends are identical, however each contains the following items:

- Block-downconverter**
- DC power inserter
- BDC Headend amplifier**
- BDC / VHF diplexer
- Directional couplers**
- F-71 & F-81 Splices
- Jumper cables**

TRANSPONDER Equality

You probably have noticed that on a given satellite some transponders produce cleaner pictures than others. The quality of a single polarity of transponders can vary by as much as 2 dB in Carrier to Noise. The amplitudes should also be within 2 dB since each channel is transmitted within 2 dB of equal power. Variations in signal amplitude of more than 2 dB must be the result of the antenna, LNA, or headend electronics.

- A**) Antenna surfaces must be free of ripples
- B**) LNA to feed interfaces must be dry

- 1)** A BDC satellite receiver is one which passively receives the entire block of satellite signals. No tuning voltage is sent to the downconverter to select a particular channel.

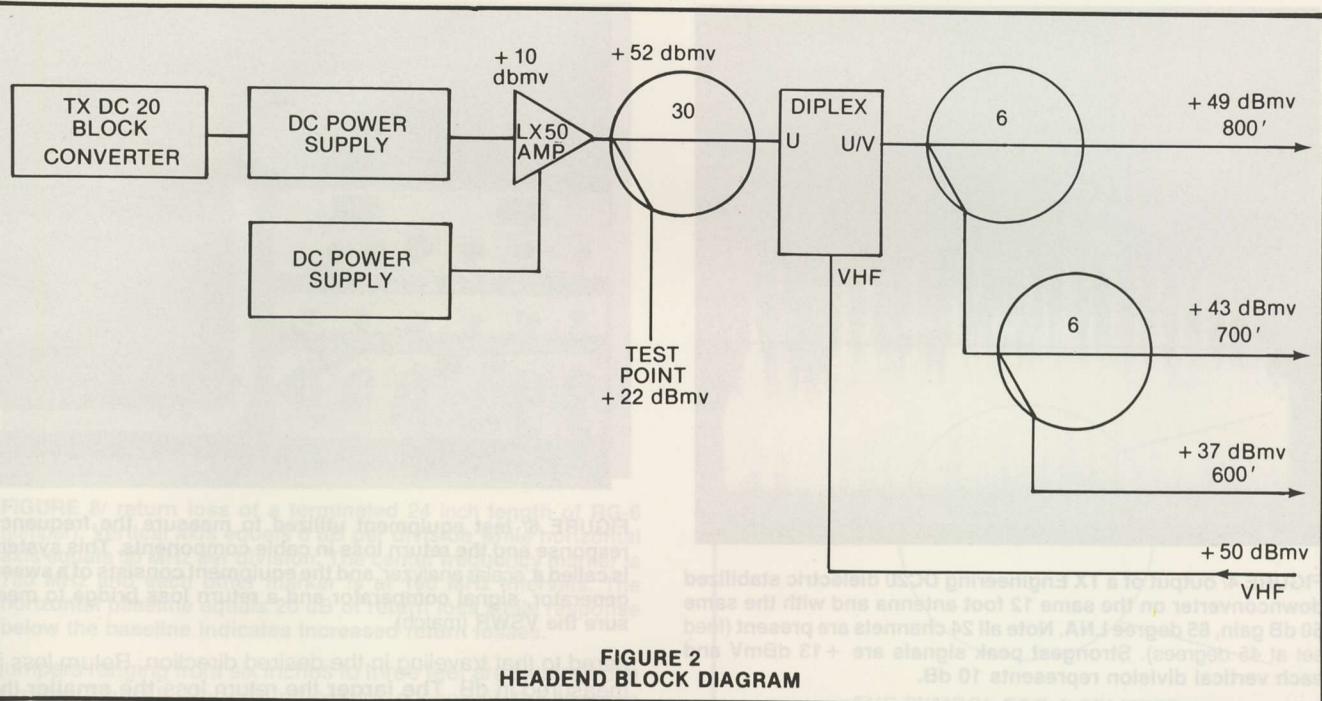


FIGURE 2
HEADEND BLOCK DIAGRAM

- C) The LNA gain must be flat and without oscillation
 - D) The block-converter must have a flat conversion loss and equally flat IF gain section

It is critical that the headend maintain the transponder to transponder signal equality. As a rule of thumb, four factors must be controlled over the entire 500 MHz distribution band:

- (1) The maximum tilt from transponder edge to edge (36 MHz) cannot exceed 2 dB.
 - (2) Adjacent channel **peak** variations must not exceed 4 dB.
 - (3) The difference between the maximum and minimum transponder peak must not exceed 6 dB.
 - (4) The downconverter local oscillator frequency drift should not exceed 5 MHz.

Low-cost block downconverters are adequate for **non-amplified** distribution, such as two receivers within a single home, but several factors should be considered before using one in an amplified distribution system. Low-cost block converters are **not dielectrically stabilized**. Temperature variations can cause either the high or low transponder to drift out of the amplified passband. The noise figure of low-cost block converters is typically 20 to 25 dB. When connected directly to a 50 dB gain LNA, the downconverter will add approximately 5 to 10 degrees of noise to the LNA temperature.

An LNB is preferable in most applications due to installation simplicity, weather-proofing, and repeatability of performance. The temperature of an LNB **includes** the noise contribution of the downconverter.

When microwave interference requires C-Band notch filtering, a dielectric stabilized downconverter should be used with an isolated 50 dB gain LNA.

The output signals of three blockconverters are illustrated in Figures 3, 4, & 5. The HP 141T spectrum analyzer is viewing the output of each unit after 100 feet of RG-6 cable and the DC Power inserter. A cross-polarized signal is used to identify the frequency location of both channel 1 and 24 while illustrating the transponder to transponder signal flatness. The location is Seattle, WA and the signal source is Galaxy 1.

For those who have test equipment and wish to make comparison tests, the HP 141T Analyzer was set as follows:

Top Graticle Reference = 0 dBm

IF Bandwidth = 300 kHz

Scan Width = 50 MHz per division

Scan Time = 2 milliseconds

(The conversion from dBm to dBmV = 49 dBm = 0 dBmV)

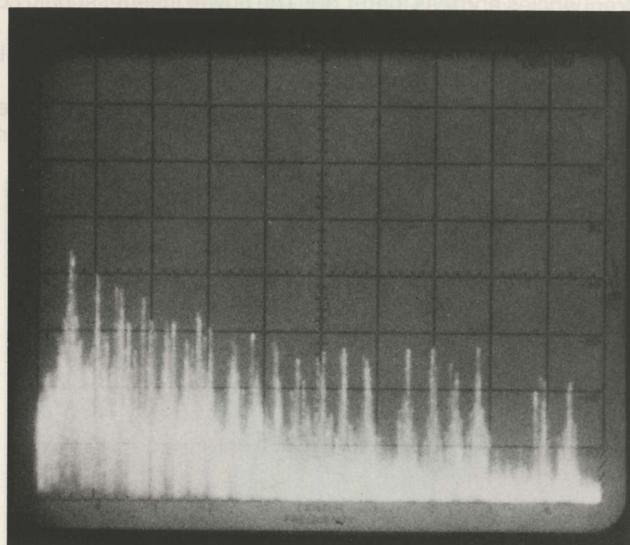


FIGURE 3/ output of a (low cost) name brand block converter mounted directly at an 85 degree LNA with 50 dB of gain, on a 12 foot antenna. The signal peak on the lowest transponder was measured at +14 dBmV while the transponder 24 signal is but -6 dBmV. Wide variations in downconverter output, such as this, will cause severe trunk distribution problems for a BDC distribution system engineer.

DC Power Inserter

The block converter and LNA in the **CTN** must be powered

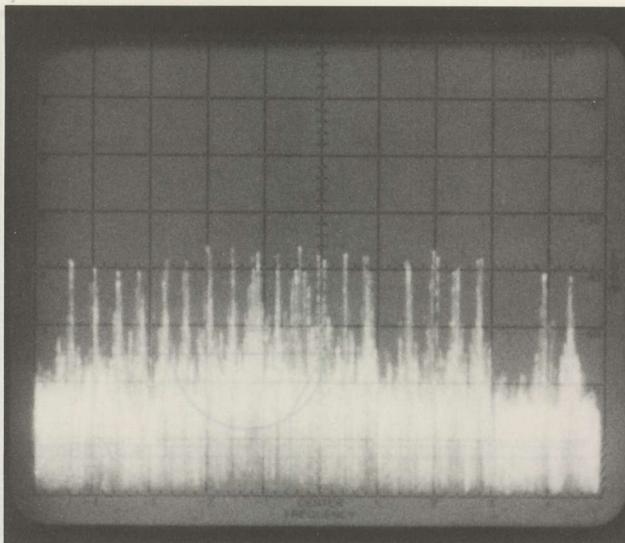


FIGURE 4/ output of a TX Engineering DC20 dielectric stabilized downconverter on the same 12 foot antenna and with the same 50 dB gain, 85 degree LNA. Note all 24 channels are present (feed set at 45 degrees). Strongest peak signals are +13 dBmV and each vertical division represents 10 dB.

independently of the individual receivers. A DC power inserter is a two port device which contains an AC to DC regulated power supply. One port of the power inserter sends DC power through the coax to the block converter and receives the returning block of satellite signals. The second port of the inserter blocks the DC voltage and allows the satellite signals to pass.

The RF insertion loss of the device should be equal at all frequencies and less than 1 dB. The power inserter should not reflect signal back to the block converter.

The measurement that indicates how much of the signal is reflected is known as RETURN LOSS.

RETURN LOSS: The relative strength of the signal reflected backwards through the transmission system com-

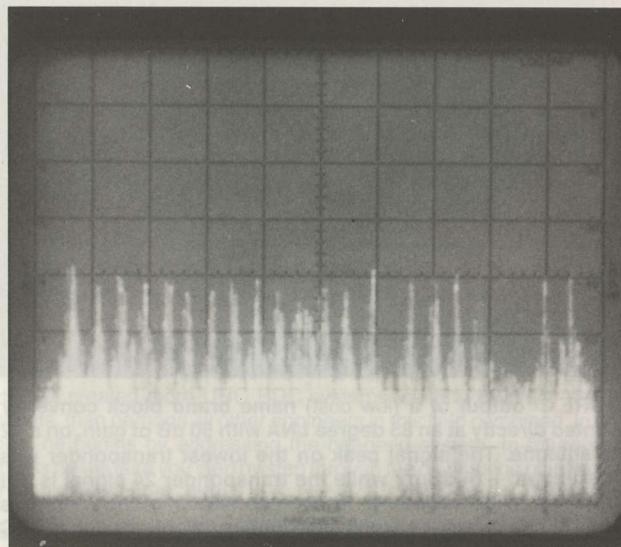


FIGURE 5/ output of TX Engineering 95 degree LNB on same 12 foot antenna. The signal peaks are +10 dBmV and each vertical division represents 10 dB.

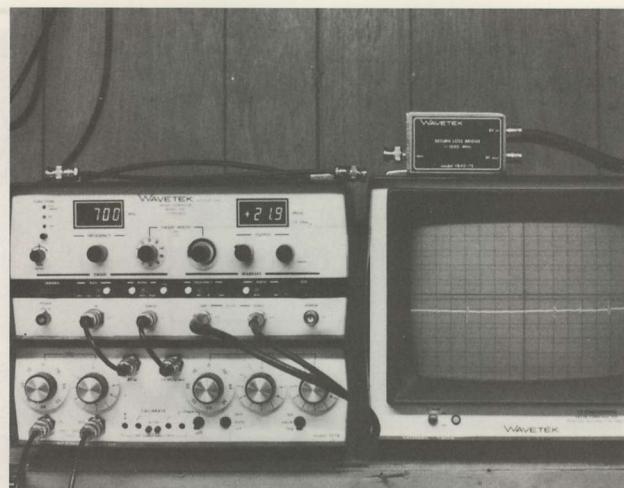


FIGURE 6/ test equipment utilized to measure the frequency response and the return loss in cable components. This system is called a 'scalar analyzer' and the equipment consists of a sweep generator, signal comparator and a return loss bridge to measure the VSWR (match).

pared to that traveling in the desired direction. Return loss is measured in dB. The larger the return loss the smaller the reflection.

SPLICES And Jumpers

One may ask why such simple items as "F" splices and jumper cables appear in the headend equipment list. At frequencies below 300 MHz splices and jumpers do not pose any problem. At 930 MHz however, wavelengths are measured in inches rather than feet. At frequencies where the jumper length equals the transmitted wavelength, reflections become tuned. The best way to observe the tuning effect of jumpers is to measure their RETURN LOSS.

The ideal cable would have no reflected signal and therefore an infinite return loss. Flexible cable however is far from ideal. The return loss of several terminated 75 ohm

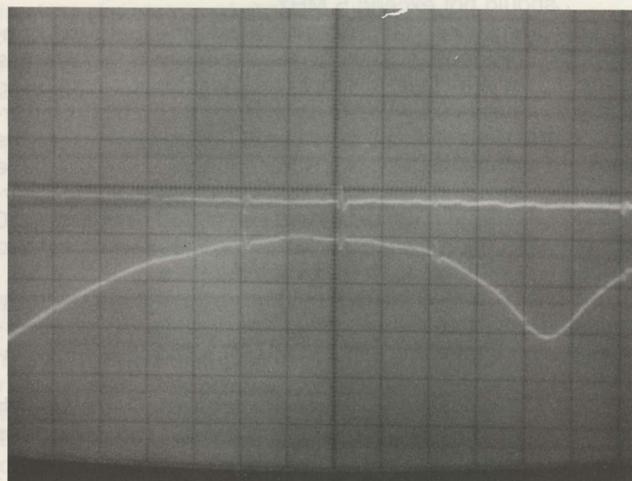


FIGURE 7/ return loss of a terminated 6 inch RG-6 jumper. Vertical axis equals 6 dB per division while horizontal axis equals 50 MHz per division. The center frequency marker is 700 MHz and each other marker is at 100 MHz intervals. The horizontal baseline equals 20 dB of return loss (a satisfactory match) while response below the baseline indicates increased return losses.

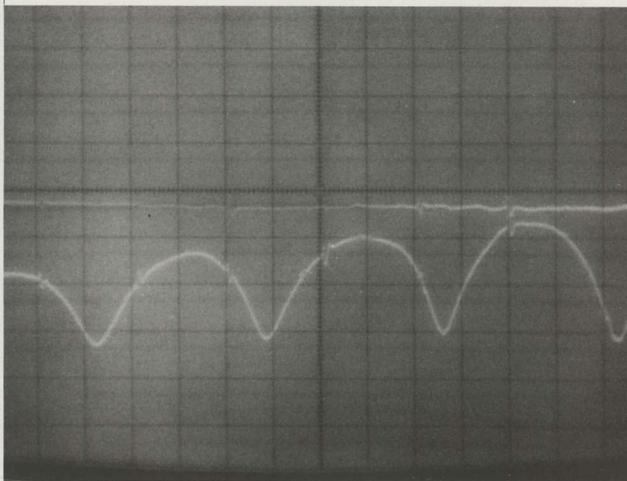


FIGURE 8/ return loss of a terminated 24 inch length of RG-6 (jumper). Vertical axis equals 6 dB per division while horizontal axis equals 50 MHz per division. The center frequency marker is 700 MHz and each other marker is at 100 MHz intervals. The horizontal baseline equals 20 dB of return loss while response below the baseline indicates increased return losses.

jumpers ranging from six inches to three feet are illustrated in **figures 7 and 8**. Periodic reflections caused by the jumpers produce peaks and valleys in the satellite block.

The use of jumpers should be avoided whenever possible. Nickel or silver plated "F" splice blocks consisting of F-71, F-81, and right angle fittings are preferable to jumpers. **DO NOT use the low-cost die-cast fittings at high frequencies.** The flexible joints on F-71 and right angle fittings provide the signal ground. The shiny die-cast surfaces do not conduct well at UHF frequencies.

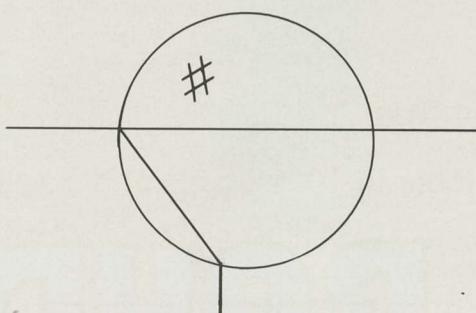
If you must use a jumper, try to **limit the jumper length to less than 7 inches**. If more than one jumper is required within the headend, be sure to make each jumper a different length.

DIRECTIONAL Couplers

Directional couplers are used to direct the output signals from the headend to the trunk cables feeding the BDC receivers.

Directional couplers are passive devices with an input, output, and tap port. As the name indicates, it directionally couples a portion of the input signal to the tap port. Reflected signals at the output port are NOT coupled into the tap port.

The high frequency directional couplers used in CTN's are



THE SYMBOLIC REPRESENTATION OF A DIRECTIONAL COUPLER ALSO INDICATES ITS UNIQUE FUNCTION.

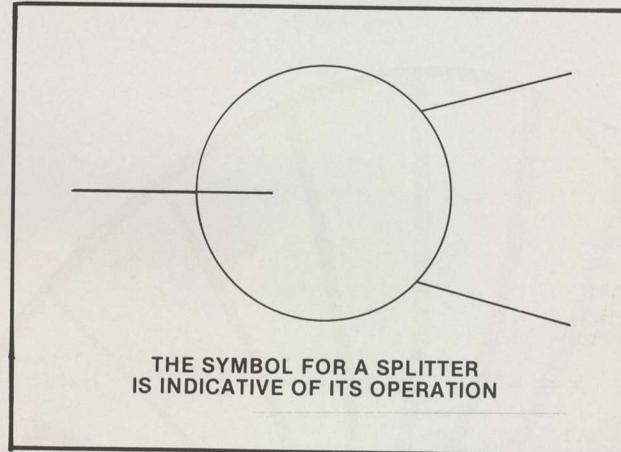
available in tap values of 6, 9, 12, 16, 20, 24, 27, & 30 dB.

SPLITTERS

A splitter simply divides the input signal into two, three, four, or eight equal outputs. The return loss of a properly terminated splitter is not as high as that of a directional coupler. A splitter reflects a greater portion of the signal hitting its input than a directional coupler. Signals reflected back to the output of a splitter can couple into the other outputs.

The high frequency splitters used in Community Television Network's have the following losses at 930 MHz;

2 way = 4 dB, 3 way = 6 dB, 4 way = 8 dB



SPLITTER vs. Directional Coupler

Why should one use a directional coupler instead of a splitter? The return loss of each port of a directional coupler is greater and the resulting frequency response of a directional coupler is better than a splitter. **Individually** the differences may be small **but when many of the passive devices are cascaded through the network, the accumulated de-**

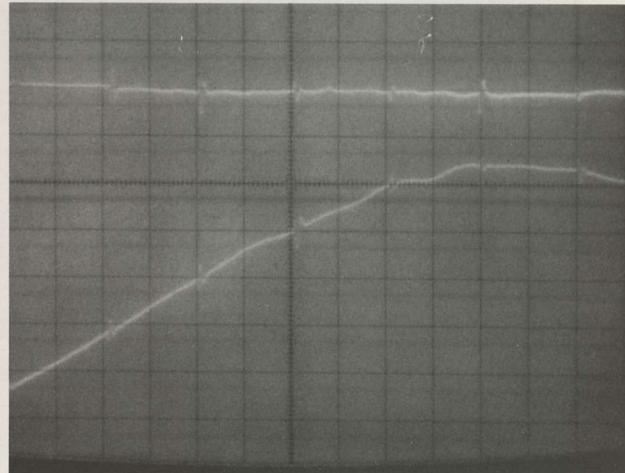


FIGURE 9/ this is the return loss of a two-way splitter. The reference line is for 20 dB of return loss and return losses of more than 20 dB are below the baseline (as is the full frequency region shown here). The vertical axis is 3 dB per division while the horizontal axis is 50 MHz per division. The center frequency marker is 700 MHz and the alternate markers are at 100 MHz spacings.

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SMATV/CTN/ continued from page 11

gradation can be severe. Directional couplers are preferred in headends for another simple reason. Signal level requirements for individual trunks are seldom identical. Directional couplers allow the designer to conserve signal for longer trunks.

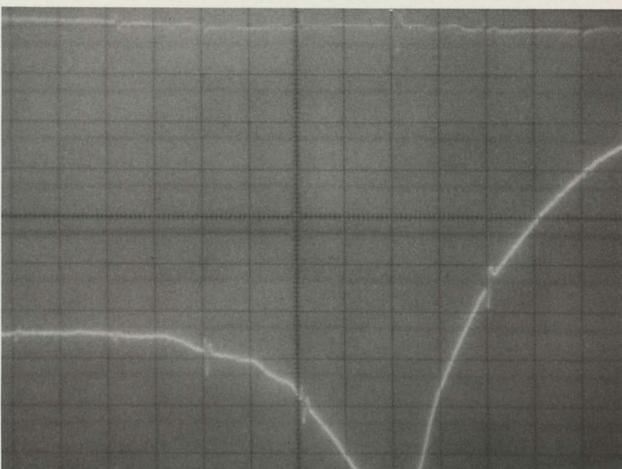


FIGURE 10/ return loss of a 6 dB directional coupler. The reference line (top) indicates 20 dB of return loss while return losses better than 20 dB are below the reference line. The vertical axis is 3 dB per division and the horizontal axis is 50 MHz per division. Center marker is 700 MHz while alternate markers are at 100 MHz spacings.

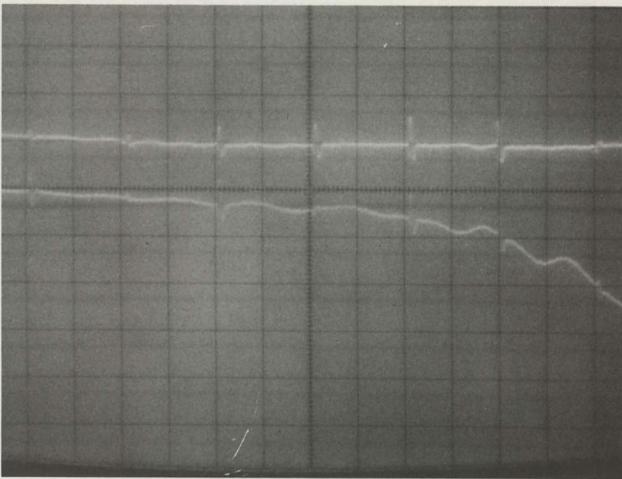


FIGURE 11/ frequency response of a two-way splitter. The reference line is 0 dB of thru-port loss. Vertical scale is 3 dB per division while the horizontal scale is 50 MHz per division. The center frequency marker is 700 MHz and the markers are spaced at 100 MHz intervals.

THE VHF / BDC Diplexer

When providing a system similar to "cable" the customer frequently expects local VHF signals to be available. Many MATV systems already in existence **could be** upgraded with the addition of a block of satellite transponders. The three port passive device that allows the placement of **both** on the **single cable** is called a diplexer. Diplexers are also useful in removing low band noise from block downconverted signals prior to amplification. Amplified off-air VHF signals are added to the amplified block of transponders at the CTN Headend. As

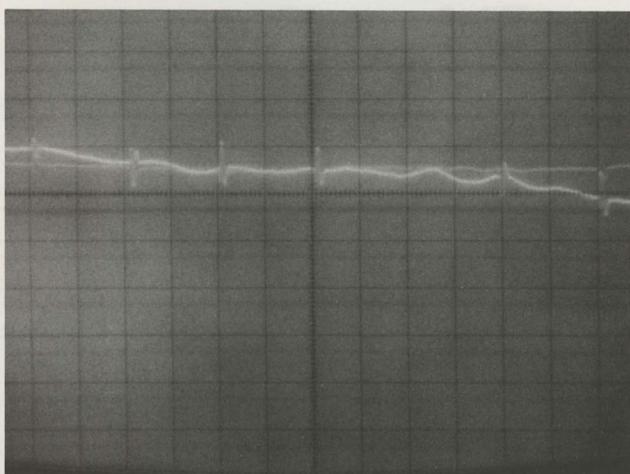


FIGURE 12/ frequency response of 6 dB directional coupler. The reference line is equal to 2 dB of thru-port loss (i.e. not 0 dB loss) while the vertical scale is 3 dB per division and the horizontal scale is 50 MHz per division. Center marker is 700 MHz and other markers are at 100 MHz spacings.

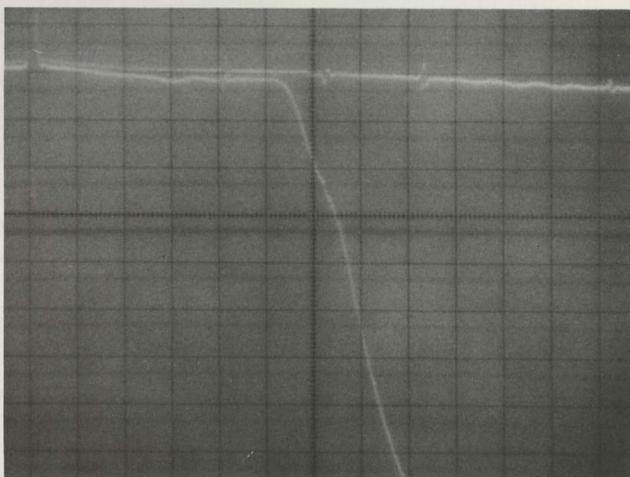


FIGURE 13/ Diplexer 'VHF port' frequency response. The center marker indicates the 300 MHz position while other markers are spaced at 100 MHz. The baseline indicates 0 dB of insertion loss and the vertical axis is 3 dB per division.

with other passive devices, diplexers must have high return loss and flat in-band frequency response.

The return loss of each port was measured to be greater than 28 dB at cross-over band edges while in band return loss was greater than 35 dB.

The swept frequency response of each input port relative to the output port is shown in **figures 13 and 14**.

THE HEADEND Amplifier

Amplification of 12 wideband FM satellite signals requires considerations not specified in standard "off the shelf" UHF television amplifiers.

Bandwidth: The bandwidth of a satellite block converter is 500 MHz. The amplifier must increase the signal level **equally** from the lower edge of transponder 1 to the upper edge of transponder 24. The **UHF television band** begins at 470 MHz and extends to 890 MHz. What happens to the **extra 80 MHz required** by the block converted signals?

Dynamic Range: The signal processing ability of a com-

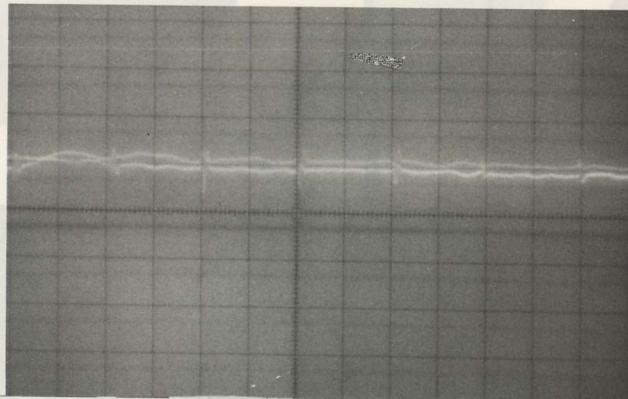


FIGURE 14/ Diplexer 'BDC port' frequency response. The center frequency marker is now 700 MHz with other markers spaced at 100 MHz each. The baseline now indicates 1 dB of insertion loss and the vertical axis is 3 dB per division.

munications amplifier is determined largely by the **noise** level at its **lower limit** and the signal **distortion** at its **upper limit**. Amplifiers required for **FM TV** operate under completely different upper and lower limit requirements than amplifiers designed for **AM TV** signals. High gain amplifiers that do not have high power handling capabilities **cannot be used** for blockconversion distribution.

Amplitude Modulation vs. Wide band Frequency Modulation: The energy contained in a single 36 MHz FM television signal is considerably greater than that of a 6 MHz AM television signal. Most UHF television amplifiers are rated based on amplification of 3 to 4 **AM** signals. If more than 4 AM TV signals are to be amplified, the manufacturer recommends de-rating the amplifier's maximum output level. Hitting an amplifier with 12 satellite signals is comparable to trying to amplify **72 AM TV signals!**

Noise Figure: The noise figure of an amplifier used to amplify amplitude modulated signals **is** a critical parameter. Thermal noise is **not important** when distributing FM signals **unless** the signal levels fall **below 10dBmV**. Noise immunity is the reason satellite uplink and downlink signals are transmitted using frequency modulation.

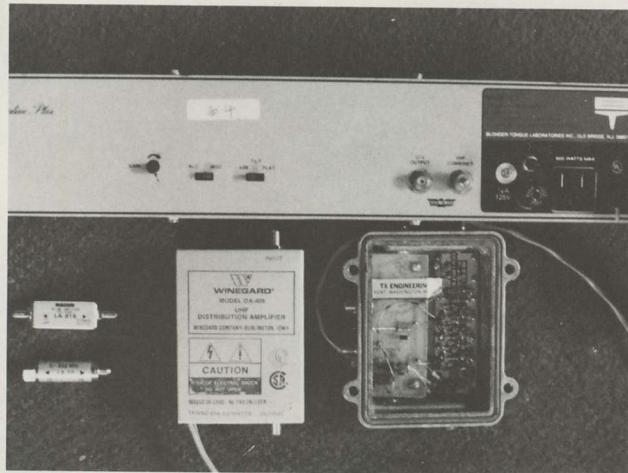


FIGURE 15/ Five commonly available amplifiers often selected by BDC installers for multiple outlet systems. The frequency response as well as the maximum power handling capability (before compression and distortion) follows.

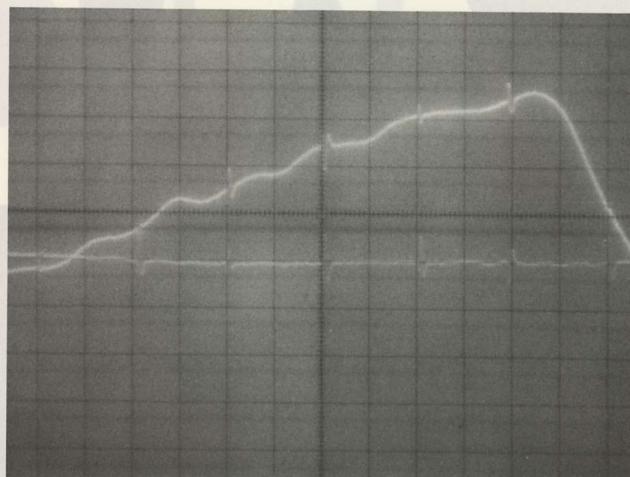


FIGURE 16/ TX Engineering model LX50 amplifier feeding a 30 dB directional coupler. The baseline is 30 dB of gain while center frequency is marked at 700 MHz with 100 MHz markers either side. Vertical scale is 3 dB per division while horizontal divisions are 50 MHz each. The 1 dB compression point occurs at +71 dBmV (about 0.2 watts total power).

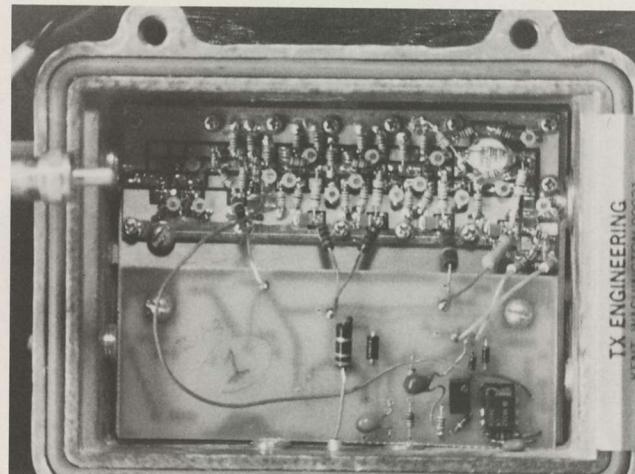
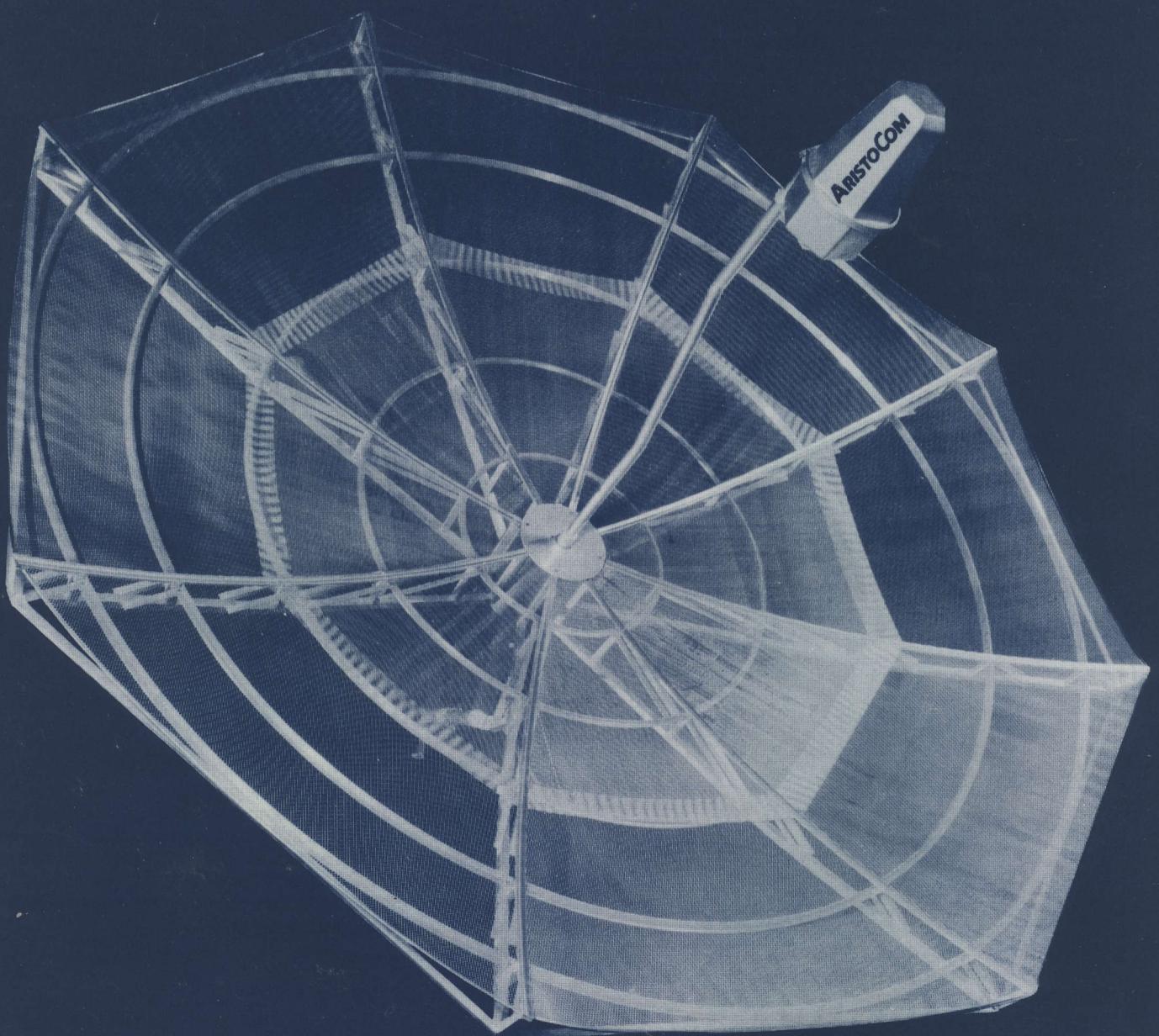


FIGURE 17/ RF circuitry of 200 milliwatt LX-50 amplifier. The 16 small trimmer capacitors across the top are factory adjusted for optimized gain versus frequency response.

Intermodulation Distortion: Distortion due to amplifier signal compression is a common problem encountered when using high gain **AM TV** amplifiers **on FM TV signals**. Tests performed at TX indicate the maximum operating level for FM TV signals is **18 dB below** the amplifier's **1 dB compression point** (*). An amplifier rated at 1 watt (+78 dBmV) could be operated at a maximum output level of +60 dBmV. If within the amplified block, one transponder was 6 dB greater than the others, the amplifier output should be limited by 6 more dB. Adding gain would simply compress the hot transponder and create distortion products in the other transponders. Automatic gain control is required to prevent the amplifier from distorting the signals. AGC detectors found in AM TV amplifiers are

(*): **1 dB COMPRESSION POINT:** The output level at which a 1 dB input signal increase results in less than a 1 dB increase at the output.

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SMATV/CTN/ continued from page 15

not calibrated to measure the power contained in wideband FM TV signals. Energy is dispersed through the entire bandwidth of FM signals.

Cable Tilt: A common problem when using AM TV amplifiers for block distribution is the upper channels fade as the system grows. The **losses** encountered in the distribution system are **greater at higher frequencies**. The headend amp should provide "anti-tilt" by having higher **gain** at higher frequencies.

Environmental Seals: Amplifiers that may be used outdoors must have both radiation **and** moisture seals. Moisture can develop around amplifiers even when placed in pedestals.

AMPLIFIER Sweep Testing

The sweep generator is used in the following tests to compare the performance of several amplifiers. Each amplifier was guaranteed a constant 75 ohm load by placing a terminated directional coupler on the output of each unit under test. The tap port of the directional coupler was used to feed the sweeper return port.

The output capability of each amplifier is determined by slowly increasing the input signal level **until** the amplifier output **ceases to increase**. The output power level at which the amplifier "compresses" the input signal is identified as the 1 dB compression point.

The frequency response and output power capability for each unit is displayed in figures 16 onward.

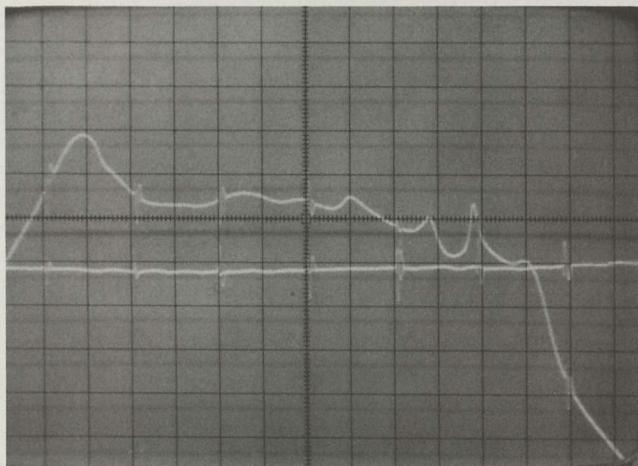


FIGURE 18/ Popular Blonder Tongue MUB-57 into a 30 dB directional coupler. The baseline is 30 dB of gain while the center frequency is marked at 700 MHz. Vertical scale is 3 dB per division with 50 MHz per division horizontal scale (100 MHz markers). The 1 dB compression point occurs at +68 dBmV.

Two LA-10 amplifiers were tested to illustrate the **variations** that occur between these devices. Of the **ten** amplifiers purchased for evaluation, only five of the units were acceptable. Problems encountered include oscillation, gain variations with vibration, and high frequency roll off. These problems may be traced to the flexible **cast** "F" male fitting located at the amplifier **input**. High frequency amplifiers require **solid grounding**. As with F-71 fittings, the only two acceptable materials for good ground connections are nickel and silver.

Macom recently introduced the LA-915 amplifier without the flexible "F" input fittings. The amplifier is specified with a gain of 24 dB plus or minus 2 dB from 400 MHz to 950 MHz.

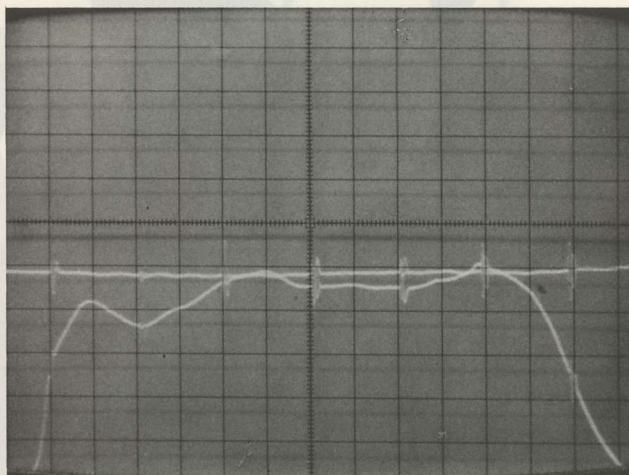


FIGURE 19/ Same MUB-57 unit with a 3 dB pad placed on the input. The baseline represents 30 dB of gain with center frequency still at 700 MHz, 100 MHz markers. Vertical scale is 3 dB per division and horizontal axis is 50 MHz per division. The 1 dB compression point is NOW +75 dBmV.

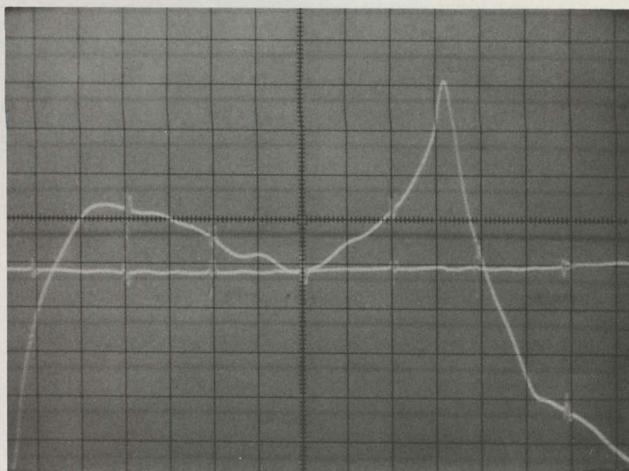


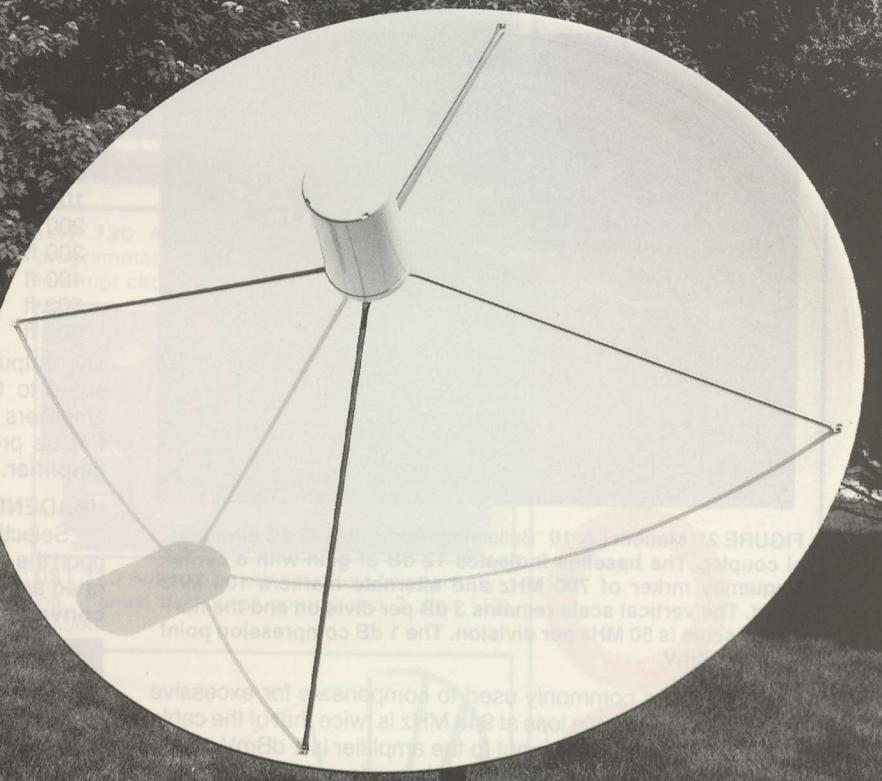
FIGURE 20/ Winegard DA-405 into a 20 dB directional coupler. The baseline is 20 dB of gain with a center frequency marker at 700 MHz and alternate markers 100 MHz apart. Vertical scale remains 3 dB per division while horizontal scale is 50 MHz per division. The 1 dB compression point is +57 dBmV.

The specified maximum output is 30 dBmV. Tests performed on 5 of the units indicate repeatable performance. **Figure 23** shows the frequency response of the amplifiers. Each unit had very high gain (29 dB) at 430 MHz but only 20 dB of gain at 940 MHz. The 1 dB compression point was measured to be +48 dBmV.

AMPLIFIER Test Results

The LA 915 is an excellent example of an amplifier **without a useful dynamic range**. The maximum input signal level that the amplifier can amplify **without creating intermodulation distortion** is computed below.

1 dB COMPRESSION POINT	=	48 dBmV
	-	18 dB
MAXIMUM OUTPUT LEVEL	=	30 dBmV
MEASURED MAX GAIN	=	-29 dB
MAXIMUM INPUT LEVEL	=	1 dBmV



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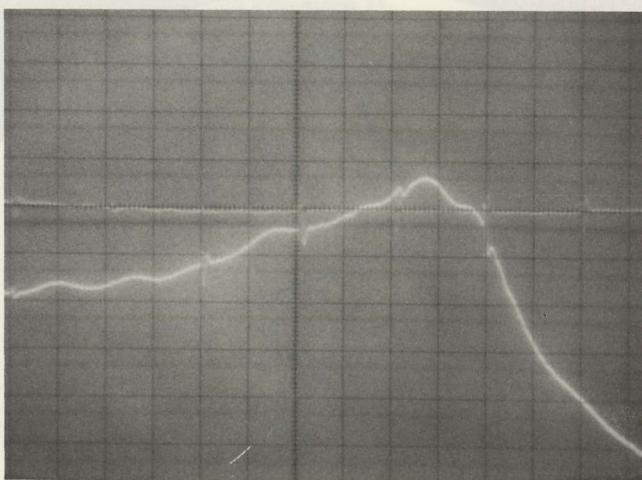


FIGURE 21/ Macom LA-10 "Bullet Amplifier" into a 12 dB directional coupler. The baseline indicates 12 dB of gain with a center frequency marker of 700 MHz and alternate markers 100 MHz apart. The vertical scale remains 3 dB per division and the horizontal scale is 50 MHz per division. The 1 dB compression point is +44 dBmV.

Amplifiers are commonly used to compensate for excessive cable loss. The cable loss at 940 MHz is twice that of the cable loss at 440 MHz. If the input to the amplifier is 1 dBmV at 440 MHz one would expect the 940 MHz level would be well below 0 dBmV. The output of the LA 915 would **increase** the cable loss tilt and **would add considerable noise to the signals**.

The MUB-57 amplifier has adjustable gain but runs out of dynamic range when the gain is set too high. **Figure 19** shows how the frequency response curve is dependent on the **input return loss** and gain control. This MUB-57 amplifier could be used to amplify BDC signals **provided** that the input signal is padded **and** the gain is limited to 30 dB.

The Macom LA-915 amplifier has a definite tilt, **but in the wrong direction!**

The TX LX-50 amplifier illustrates the necessary tilt to compensate for cable loss. The gain at **430 MHz** is measured

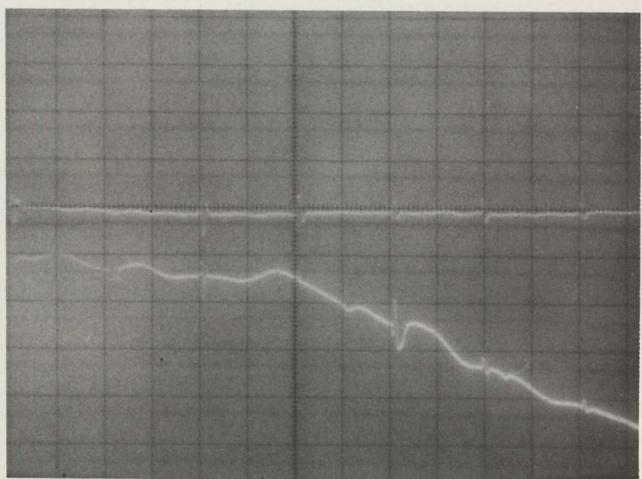


FIGURE 22/Second Macom LA-10 "Bullet Amplifier" into a 12 dB directional coupler. The baseline still indicates 12 dB of gain with a center frequency of 700 MHz and alternate markers at 100 MHz each. Vertical scale is 3 dB per division and horizontal axis is 50 MHz per division. The 1 dB compression point on this second LA-10 remains at +44 dBmV.

to be **30 dB** while the gain at **930 MHz** is **42 dB**. If one were to connect the LNB signal of figure 4 to the LX-50 amplifier, the output on transponder 1 would be 40 dBmV while the transponder 24 output would be 52 dBmV.

RG-6 CABLE LOSS

Distance	430 MHz	930 MHz	TILT
100 ft	5 dB	7 dB	2 dB
200 ft	10 dB	14 dB	4 dB
300 ft	15 dB	21 dB	6 dB
400 ft	20 dB	28 dB	8 dB
500 ft	25 dB	35 dB	10 dB
600 ft	30 dB	42 dB	12 dB

The output **after** 600 feet of RG-6 cable would be exactly equal to the LX-50 amplifier input signals. When several amplifiers are to be cascaded it is important that **each amplifier** be presented with the **same input signal as the first amplifier**.

HEADEND ASSEMBLY

Selection of the headend components is made based upon the performance of the individual elements. **Not all UHF** rated active and passive devices perform well **above block-converted transponder 20**. High frequency performance

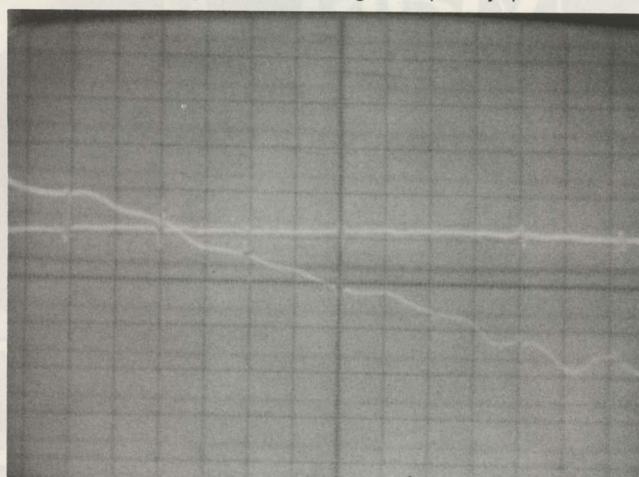


FIGURE 23/Macom LA-915 amplifier into a 20 dB directional coupler. The baseline represents 20 dB of amplifier gain with a center frequency marker at 700 MHz. Alternate markers are 100 MHz spaced. The vertical scale is 3 dB per division and the horizontal axis is 50 MHz per division. The 1 dB compression point was measured at +48 dBmV.

variations can exist between "identical" off the shelf UHF rated devices. The only way to be 100% sure of the device performance is sweep testing each unit. One must either **purchase swept tested devices** or have the necessary test equipment to rate the performance of "off the shelf" UHF units.

In review, the important headend parameters are:

- 1) The antenna and LNA are selected to provide the desired Carrier to Noise Ratio.
- 2) The blockdownconverter or LNB is selected to provide equal amplitude transponder output **at a sufficient level** to reach the headend amplifier **with greater than +10 dBmV**.
- 3) The power inserter is selected based on proper supply voltage, (low) flat insertion loss, **and** high return loss.
- 4) "F" connections are made with high quality **F-71** and **F-81** fittings **eliminating jumpers** whenever possible.
- 5) The headend amplifier must:

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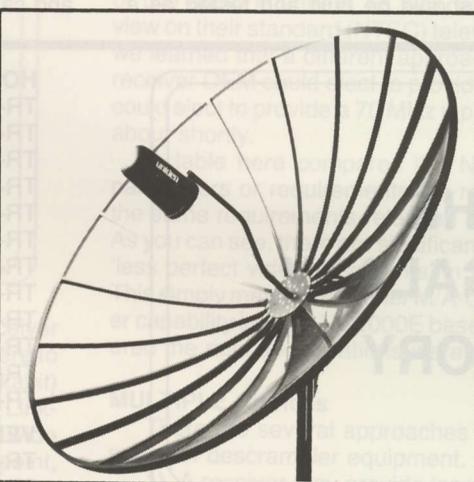
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- A) Have sufficient gain to increase the signal level of the blockconverter output to an amplitude of +50 to +60 dBmV.
- B) Have a 1 dB compression point **18 dB greater than** the desired output level. (+50 dBmV + 18 dB = 68 dBmV = +19 dBm).
- C) Automatically maintain the output level — even with increasing input signal level.
- D) Provide an adjustable linear "tilt" in the gain versus frequency response. Since the cable loss at transponder 24 is double that of transponder 1, **amplifiers spaced at 30 dB intervals should have 15 dB of tilt**. Insertion loss of passive devices is fairly flat however, so **less tilt is required** when trunks contain passives.
- 6) Sweep tested directional couplers with high return loss are selected to couple the amplifier output into each trunk cable.
- 7) VHF off air signals may be amplified and diplexed with the amplified BDC transponders. **A second diplexer** is used as a **high pass filter** at the BDC amplifier input to remove any downconverted VHF band noise.
- 8) The entire headend should be built and tested as a

complete unit prior to shipment.

CONCLUSION

Dealers who wish to market multi-home satellite systems should be aware of the frequency of the signals that travel from the headend to each individual receiver. "Off the shelf" UHF distribution equipment may work with the blockconverted satellite band but the manufacturers only specify and test that equipment for the 470 MHz to 870 MHz **AM** television band. Only dealers with patience, a good technical background and a spectrum analyzer should attempt to make the AM equipment work for small multi-home installations.

For most dealers, the ease of installation and reliability of equipment built for blockconversion distribution will be worth the additional engineering cost. One need not be an engineer to tackle a multi-home project when provided with pre-tested headend packages.

The BDC receiver is simply the "converter" in the block-converted network required to provide satellite signals to multiple homes.

In Part Two of BDC DISTRIBUTION NETWORKS, amplifier spacing, single port and multi-port directional couplers, and cable system design will be discussed.

THE HALF-GALAXY THEORY

Most people do not waste much thought on which programs of Galaxy 1 are on the horizontal and which on the vertical polarities. Almost all home TVROs are equipped with Polarotors™ so it really doesn't make much difference. But let's look at the use of Galaxy 1 transponders for mini-SMATV using one antenna, two LNA's and two block downconverters to bring all 24 transponders down to receivers in subscribers' apartments by means of home-run coaxial cable runs.

The only problem one runs into is that of providing the horizontal and vertical switching capability to each subscriber. This becomes quite complicated and expensive whether one uses a series of V/H switches, power dividers, DC blocks, power supplies and line amps when using the 900 to 1400 MHz frequency, or, dual cabling with A/B switches and line amps at lower frequencies. But let's assume that it is sufficient to provide **only one polarity** of Galaxy 1 to satisfy subscribers. Here's what one could now provide to mini-SMATV:

by
Peter Sutro
MPI Satellite
Bernardsville, N.J.

HORIZONTAL

TR- 1 HBO (**not in use**) Presumably to be Cinemax West
 TR- 3 HBO (**not in use**) Presumably to be HBO West
 TR- 5 Showtime East
 TR- 7 CNN
 TR- 9 ESPN
 TR-11 CBN
 TR-13 C-Span
 TR-15 WOR-TV
 TR-17 BET
 TR-19 Cinemax East
 TR-21 HBO (**not in use**) Presumably to be USA
 TR-23 HBO East

VERTICAL

TR- 2 Nashville Network
 TR- 4 Disney Channel East
 TR- 6 SIN
 TR- 8 CNN Headline News
 TR-10 The Movie Channel East
 TR-12 Home Team Sports
 TR-14 The Movie Channel West
 TR-16 Showtime (**not in use**) Presumably to be Showtime West
 TR-18 WTBS-TV
 TR-20 Galavision
 TR-22 Group W (**not in use**) Presumably for sale
 TR-24 Disney Channel West

Clearly the horizontals have an edge in popularity over the verticals. Now, **suppose that** HBO could be convinced that it made business sense to trade Transponder 3 with Disney's Transponder 4 and Transponder 1 with The Movie Channel's Transponder 10. Now, there would be **no redundancy** on either polarity and the new line-up for the horizontals would be:

TR- 1 The Movie Channel East
 TR- 3 Disney Channel East
 TR- 5 Showtime East
 TR- 7 CNN
 TR- 9 ESPN
 TR-11 CBN

TR-13 C-Span
 TR-15 WOR-TV
 TR-17 BET
 TR-19 Cinemax East
 TR-21 USA Network
 TR-23 HBO East

Now suppose that 6 of the 12 programmers were to scramble their signals and offer a bundled and tiered package to mini-SMATV. **Subscribers could then choose** one or more of the movie channels together with the 6 unscrambled basics. The line-up would be as follows:

SCRAMBLED	UNSCRAMBLED
HBO	CNN
Cinemax	CBN
Showtime	C-Span

The Movie Channel	BET
Disney Channel	USA
ESPN (for black-out security)	WOR-TV

The scrambled services would pay a portion of their revenues to the unscrambled services.

The approximate cost of the hardware for such a system would be \$500 for the roof or headend equipment consisting of a 6 foot antenna, 65° LNA and superfeed and block down-converter. Added to that cost, prorated by the number of subscribers accessing that headend, would be the cost of a receiver and decoder for each subscriber.

I believe that there would be an enormous mini-SMATV market using this approach both in cabled and uncabled territories of urban, suburban and underpopulated areas of the United States.

INTERFACING DESCRAMBLERS

While the industry had been 'warned' that certain receiver requirements would be mandatory, if TVRO receivers were to properly 'function' with the VC series of M/A-Com (Linkabit) descramblers, few of those industry people attending the Linkabit seminar March 28 and 29 were prepared for the wide range of requirements which were unveiled. Until this point, we had been told that certain video parameters (such as differential phase and gain, video baseband output level, et al) would be specified and that our receivers would be expected to meet these parameters. The initial information released by M/A-Com last fall was exceedingly 'tight'; suggesting that only a handful of existing receivers, if indeed any, would qualify. Most receiver OEMs took this as a signal that they would have to do extensive redesign work on their receivers.

NOTE: Alli Lake, a technical consultant to CSD in the area of scrambling technology, attended the Linkabit (M/A-Com) 'Home TVRO Industry Introduction' two-day seminar held in La Jolla, California just days prior to the recent STT/SPACE trade show. This begins a multiple-part series describing the technology of Linkabit as well as the operational and interfacing requirements of Linkabit (Videocipher) descramblers to home-style TVRO receivers. Because of the urgency of this information, CSD plus CSD/2 will publish this series in two-week increments with part two appearing in CSD/2 for May 15th. CSD/2 for April 15th contained our report on tests conducted by Lake for CSD on ten home-style receivers randomly selected, using the M/A-Com VC2C 'cable family' descrambler unit.

by
ALLI LAKE
 "The Satellite Link"
 Fort Lauderdale, Florida

All of the attention to date has focused on a 'baseband interface'; in other words, we had expected that an external descrambler box, later to be called the VC2000E, would accept video from our receiver's baseband output and then process that video to descramble the signal and provide one or two audio channels, as well, which our customers would view on their standard (NTSC) television receivers. In La Jolla we learned that a different approach was being planned; the receiver OEM could elect to provide a baseband output or he could elect to provide a 70 MHz input. We'll see what that is all about shortly.

A table here compares the November 1984 baseband parameters or requirements, as released by M/A-Com, and the same requirements released by Linkabit on March 27th. As you can see, there are significant changes leaning towards 'less perfect video waveforms' in the more recent numbers. This simply means that either M/A-Com decided to build greater capability into the VC2000E baseband unit, or, they discovered the rigid specifications were not required afterall.

MULTIPLE Choices

There are several approaches to interfacing with the VC series of descrambler equipment.

- 1) A receiver may provide 'composite video' at an output jack on the receiver. The specifications for this interconnection are shown here in **table 2**. Note that the receiver must provide unclamped, deemphasized, composite video and **at the same time** also provide clamped video and mono or stereo audio so that **non-scrambled** signals can pass through the external (VC2000E) unit and to the TV receiver.
- 2) Or, a receiver can interconnect at 70 MHz (rather than at video). In this case, the VC2000E processes the signal first at 70 MHz and then creates its own baseband signal which it descrambles and then remodulates to VHF channel 3 or 4. The parameters for this are shown in **table 3**.
- 3) Or, the receiver OEM may elect to redesign his receiver so that a descrambler device (model VC2000M) can be installed or inserted directly into the receiver proper. This is the so-called IRD (integrated receiver-descrambler) approach and this 9.02" by 11.5" by 1.77" 'cassette' contains all of the technology required to upgrade a compatible receiver to a descrambled-service-compatible unit. Selected parameters for the VC2000M interfacing are found here in **table 4**.

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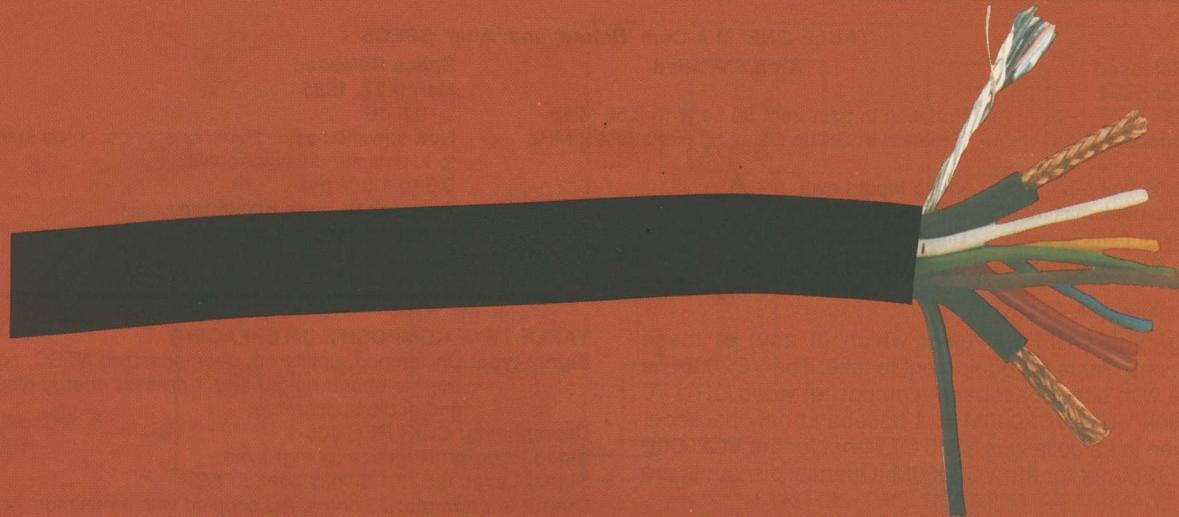


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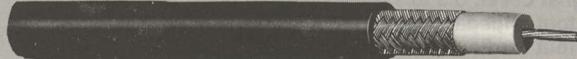
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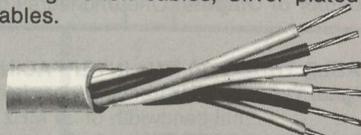
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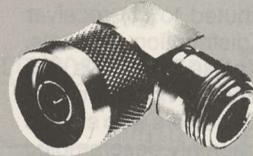
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TABLE ONE/ M/A-Com 'Before' and 'After' SPECS

Specs Released November 1984	Area Specified	Specs Released March 27, 1985
± 0.5 dB	Variation in gain from 50 hertz to 3.58 MHz	± 0.5 dB
± 50 nano-seconds	Variation In Group Delay 50 Hertz to 4.2 MHz	Now specified as ± 25 nanoseconds, chrominance to luminance delay inequality
0.95 to 1.05 volt p-p 5% peak to peak maximum 4° maximum peak to peak	Video Input Level Differential Gain Differential Phase	0.5 to 1.5 V p-p 7% peak to peak maximum 5° maximum peak to peak

Note: **Boldface** specs are **most liberal** of two quoted.

Pricing. The OEM will elect which (if any) of these approaches he wants his equipment to take. The VC2000E is compatible with either baseband (composite) video OR a 70 MHz RF 'link.' The VC2000M is a baseband only package. Pricing given in La Jolla was \$325 OEM-net for the VC2000E and \$150 OEM-net for the VC2000M. Quantity discounts are not likely.

In this first-part look at the new hardware requirements, we will paint a broad overview of the technology and information now available. In the next several issues of **CSD/2** (starting May 15th) and **CSD** (June 1st) we'll report in greater depth just what the ramifications of these requirements will be.

GENERAL Overview

The VC2000E unit will first be available in 'late summer.' This package will be manufactured by M/A-Com in Puerto Rico. The quantity of units available has not been determined because M/A-Com has no orders for the units at this point.

The VC2000M is also to be manufactured in Puerto Rico and M/A-Com says they have a production **capability** of 'up to 150,000 per month.' M/A-Com has no orders for the 'M' version at this point.

The 'E' (stand alone) unit will be distributed to (1) M/A-Com distributors, (2) OEMs for system packages, (3) directly to programmers (i.e. HBO or Showtime) for re-distribution to their approved affiliates (i.e. cable TV, SMATV, et al), and (4) directly to the consumers **through programmers** who plan to market directly to consumers through a 'telephone sales' (telemarketing) program.

The 'M' (module) unit will be distributed to (1) receiver OEMs for redistribution through normal distribution channels, and, (2) to 'others.' The 'others' include (cable TV) MSOs who would retain ownership of the 'M' units and provide them on a rental or lease agreement to home TVRO viewers who sign up through their (local) cable affiliates for monthly descrambled service.

Both units have the following operational capabilities:

1) **Electronic mail** (i.e. messages sent via the uplink to a single home user);

2) **Parental control** (the user programs in with a keypad the program rating level authorized such as PG; any program that has a rating of R or X would automatically be denied to the viewer unless the instructions were re-entered);

3) **On-screen display** of (text) program data including the general description of the movie or feature, the amount of time left in the feature before it is over, the rating of the feature;

4) **Personal messages** and general messages (including text services).

The on-screen display of text information is 20 characters long and there are 9 character-lines available. The information will appear as white characters against a black background set over the transmitted programming, or white characters against a black background that covers the full screen for

TABLE TWO/ COMPOSITE INTERFACING

Signal type: Unclamped, unfiltered, deemphasized NTSC, composite baseband output and if present energy dispersal and audio subcarriers.

Deemphasis: CCIR REC.405-1

Video Polarity: Negative (going) sync

Signal Level: 0.5 to 1.5 volts peak to peak

Output Impedance: 75 ohms, AC coupled with a minimum of **1500 Mfd** coupling capacitor, or, DC coupled (with maximum DC offset of ± 3 volts)

Output Return Loss: 15 dB minimum

Frequency Response: ± 0.5 dB from 30 hertz to 3.58 MHz; ± 1.0 dB from 3.58 MHz to 4.2 MHz

Chrominance-

Luminance

Delay Inequity: ± 25 nanoseconds maximum

Differential Gain: 7% peak to peak maximum for 10-90% APL

Differential Phase: 5° peak to peak maximum for 10-90% APL

Line Time Distortion: 5 IRE units peak to peak maximum

Field Time Distortion: 5 IRE units peak to peak maximum

Weighted Signal

To Noise: 47 dB minimum with deemphasis

Connector: RCA phono (recommended) or type F female.

For Non-Scrambled Signals Fed Thru:

Signal Type: Clamped, lowpass filtered, deemphasized NTSC baseband

Signal Level: 0.5 to 1.5 volts peak to peak

Output Impedance: 75 ohms (AC coupled)

Output Audio: baseband

Audio Level: 300 mV to 5 volts peak to peak

Output Impedance: 1,000 ohms maximum

Connector: RCA phono

Number of Outputs: One (monaural) or two (stereo left and right)

TABLE THREE/ 70 MHz INTERFACING

Signal Type: 70 MHz frequency modulated (FM) signal with a nominal bandwidth of 30 MHz

Signal Level: -55 dBm to 0 dBm

Center Frequency: 70 MHz, ± 5.0 MHz maximum

Output Impedance: 75 ohms

Carrier To Noise (*): 9 dB minimum measured with 30 MHz noise bandwidth

*/ Linkabit says that with a 9 dB carrier to noise ratio the system will function with a 'bit error rate' of 10^{-3} . This equates to near-perfect recovery of 'all data' and is **not mandatory** for descrambled television viewing.

TABLE FOUR/ IRD/'M' INTERFACING REQUIREMENTS

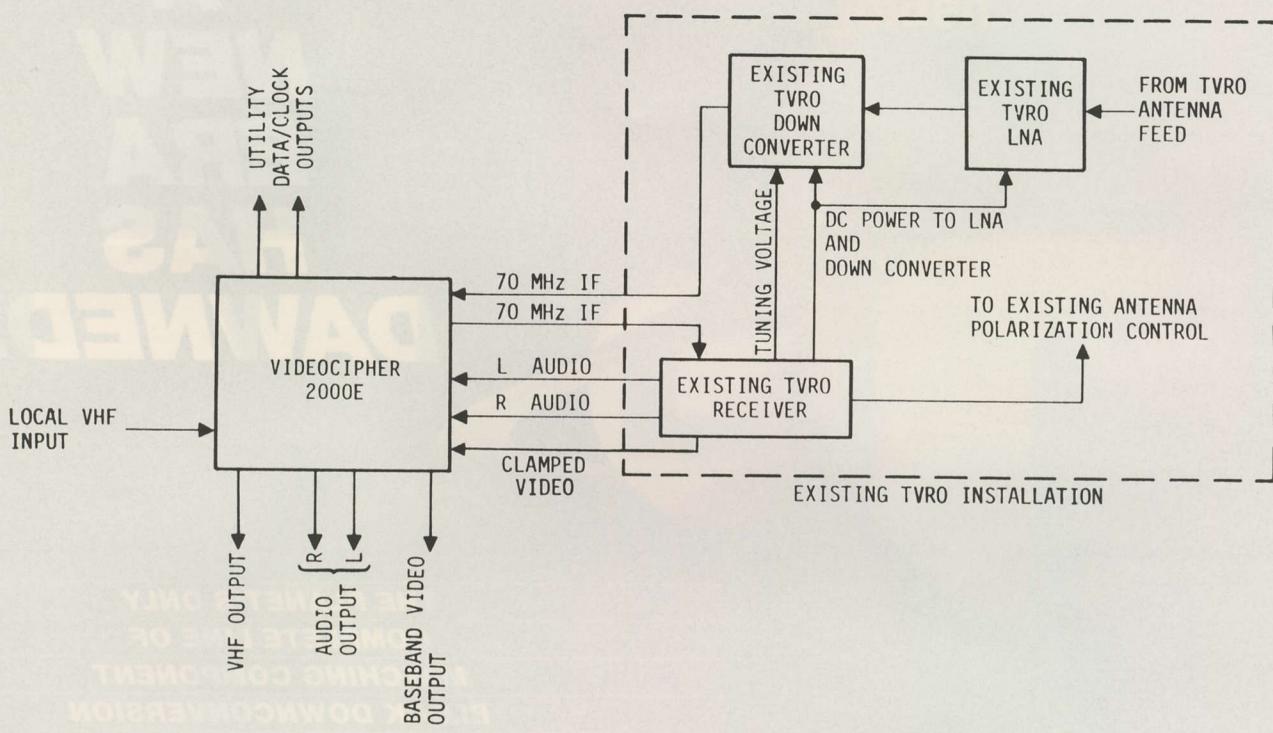
NOTE: Only selected requirements shown; detailed analysis will appear in **CSD/2** for May 15th.

Signal Type: Scrambled or unscrambled NTSC

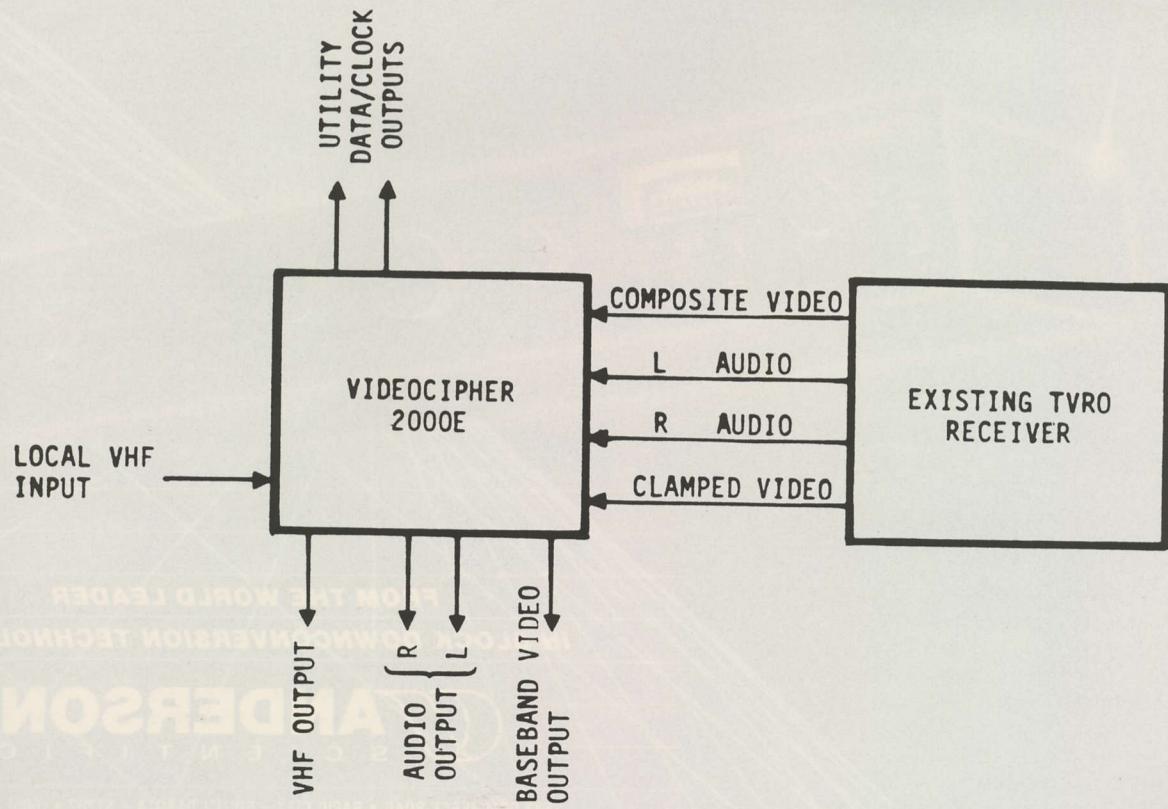
Output Impedance: 100 ohms or less

Signal Level: 1V peak to peak, deemphasized, AC coupled into 1,000 ohms nominal impedance (VC2M has ± 3 dB AGC range)

Video Polarity: Black to white transitions positive going.



LINKABIT TVRO-2000E configuration for 70 MHz interface for those applications where composite baseband interfacing is not desirable nor possible. (Drawing courtesy of M/A-Com)



LINKABIT TVRO-2000E configuration for composite baseband interface for use when baseband signals are sufficiently 'pure' to allow direct interfacing. (Drawing courtesy of M/A-Com)



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more lengthy messages.

Each individual subscriber location has **56** different authorization levels capable. That means that the subscriber can select 56 different 'tiers' or levels of service, involving one or a greater number of separate 'service/programming' channels. A subscriber might opt for all of the 'PG' rated features from 'Service H,' all of the 'R' rated services from 'Service S' and all of the 'X' rated features from 'Service P' as **one example** of how the 56 different combinations might be employed.

The actual method of collecting money and authorizing a user will depend upon **the programmer**. All that Linkabit has done is to provide the programmer with a host of 'options'; they have not directly determined the actual method of payment and collection. Here are a few of the possibilities:

- A)** A subscriber 'rents' his 'E' or 'M' series unit from a local cable operator. The cable operator is paid, directly, by the subscriber each month and the cable operator reports receipt of payment to HBO (et al). The subscriber's electronic address code is then transmitted through the satellite feed and the unit authorizes (or continues authorized).
- B)** The subscriber 'buys' his 'E' or 'M' series unit from a national telemarketing plan (several are proposed) and the unit arrives with complete installation instructions, all cables, and details on what to do after assembly. This would include telephoning a toll-free number, reporting that your unit is installed, and arranging (through the exchange of credit card information) for **pre-payment** for a month's service. The user would be instructed to place the satellite antenna and receiver on a specific transponder and 'to wait.' Their authorization code would then be transmitted through the system and the unit would be authorized.

During the La Jolla demonstrations, and during the Las Vegas demonstrations (within the M/A-Com booth) a great deal was made of the 'pay per view' capability of the system. In pay-per-view, the programmer assigns two 'numbers' to each program transmitted: **(1)** a program rating (such as PG), and, **(2)** a dollar value. The subscriber is able to look at this information on the screen and make a 'purchase decision.'

The descrambler has a miniature 'electronic bank' inside; the subscriber is able to pre-pay some amount of money (such as \$50) into the collection service (pay the local cable company, call an 800 number and authorize the charge to a credit card) and then the uplink sends a message through the satellite to the subscriber's box. The message 'loads' the bank in the box with the \$50 payment. On the screen, the subscriber can check his or her 'bank balance' at any time.

Then as each program is selected, and viewed, the bank balance reduces by the amount of the per-program charge. When the bank is 'empty' the subscriber will find he or she can no longer access any new programs until additional pre-payment funds have been paid to the program representative.

OEM Interfacing

There is a 'trickle-down' theory at play here. If M/A-Com is successful in selling their 'M' or 'E' versions to OEMs, these packages will eventually 'trickle down' through the distribution chain to the consumer via either a TVRO dealer or through a local cable affiliate. The 'M' unit availability depends totally on the cooperation of the OEMs since you cannot retrofit the 'M' module to an existing receiver unless the receiver designer has made provisions for it.

The 'E' unit, on the other hand, could be sold to the OEMs (who in turn would package it with a receiver for re-sale to

distributors/dealers), **or**, it could be sold directly to an 'authorized program representative' (such as the local cable firm) **or** even directly to the consumer through a much discussed 'telemarketing plan.'

The 'E' unit, because it will accept **either** composite baseband video **or** 70 MHz 'IF-RF,' is intended to be the 'mop-up system.' It will function with virtually any receiver now in place or being sold since it has the versatility to 'correct' for almost any receiver design 'malfunction' and still produce descrambled service. M/A-Com is hopeful that the IRD or 'M' series unit will ultimately be 'the only unit required' however because they feel that a receiver properly modified for the IRD/'M' series unit will function better long term for the viewer.

Use of the 'E' unit, then, requires nobody to do anything except to agree to buy it. Composite video output, if it is 'clean enough,' will drive the unit. And if the composite will not work, a 70 MHz input signal from the LNC or downconverter will drive the unit. In this instance, the existing receiver still has to select channels, adjust polarization and control the dish movements however. **A block diagram**, provided by M/A-Com, shows how this works (see page 27).

Use of the IRD/'M' unit requires a far greater commitment on the part of the OEM. The complexity of the receiver redesign for the IRD unit is such that we will spend all of our May 15th segment of this overview on that topic alone. However, here are the highlights:

- 1) The unit has physical mass;** it requires a space slightly larger than 9.02" by 11.5" by 1.77" just to house it. Many receivers are smaller than this 'IRD' unit so those receiver OEMs electing to go in this direction are going to have to accept that 'bigger is better.'
- 2) The unit has physical powering requirements.** It requires five separate power supply 'lines' as follows:
 - A)** A digital supply line of +5 VDC with a current requirement of up to 1.10 amps;
 - B)** An analog supply line of +5 VDC with a current requirement of up to 0.08 amps;
 - C)** A -5 VDC supply line with a current requirement of up to 0.14 amps.
 - D)** A +12 VDC supply line with a current requirement of up to 0.15 amps;
 - E)** A -12 VDC supply line with a current requirement of up to 0.065 amps.

If you 'sum' these current maximums, you find that the new demands on the TVRO receiver power supply are **in excess of 1.5 amps.** This is a not insignificant additional power supply drain since most receivers now supply less than 1.5 amps from their power supplies for **ALL** of the existing receiver functions. As an illustration, those receivers which supply power through a wall-socket mounted integrated power supply unit seldom supply more than 1.0 amps total current. A power supply capable of supplying **both** the existing powering requirements of the receiver **and** the new, additional powering requirements of an IRD/'M' unit will have to be a newly designed power supply housed inside of the receiver proper; not via an outboard wall-socket mounted power supply.

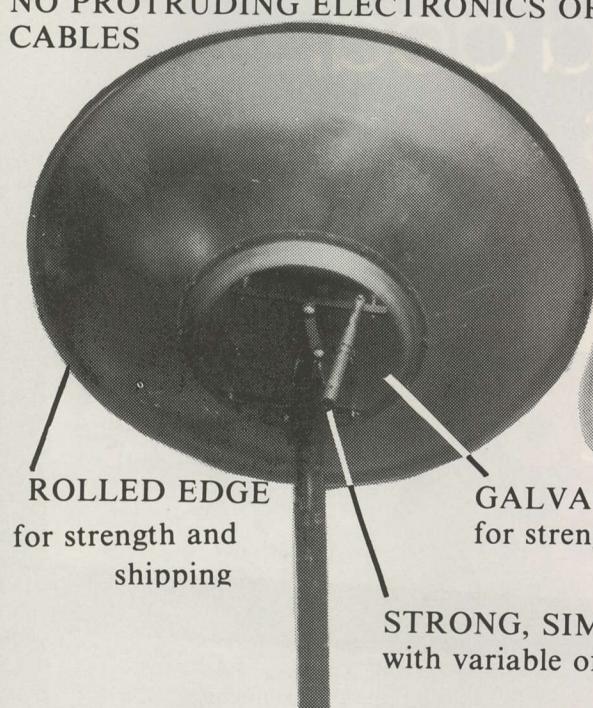
- 3) With the increased power supply requirements** comes a parallel design consideration; **heat.** Many receivers have moved the power supply 'outside' to a wall mounted socket container because this places a considerable source of 'heat' away from the receiver proper. Electronic parts do not like heat and efforts to make receivers 'run cool' are more than aesthetic; it helps the

THE PARABOLIC JUST BECAME OBSOLETE

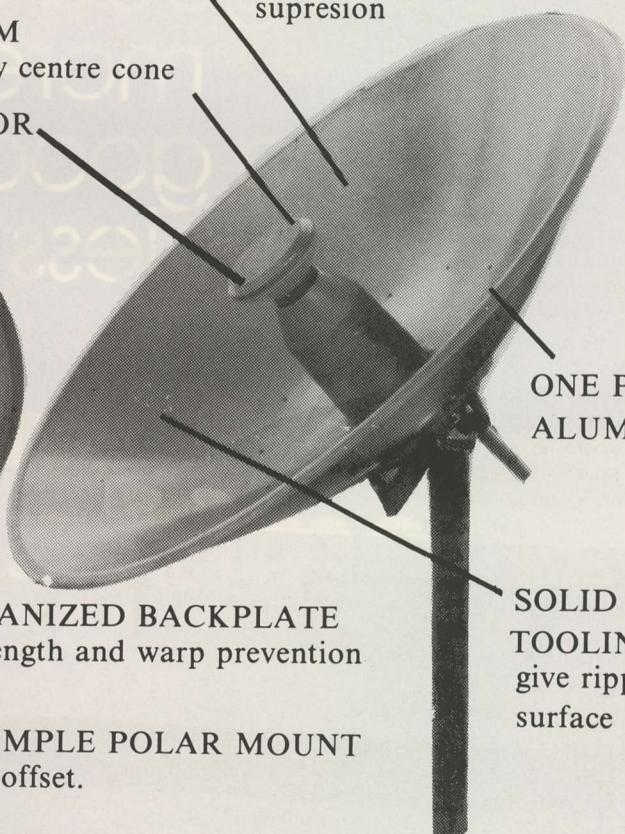
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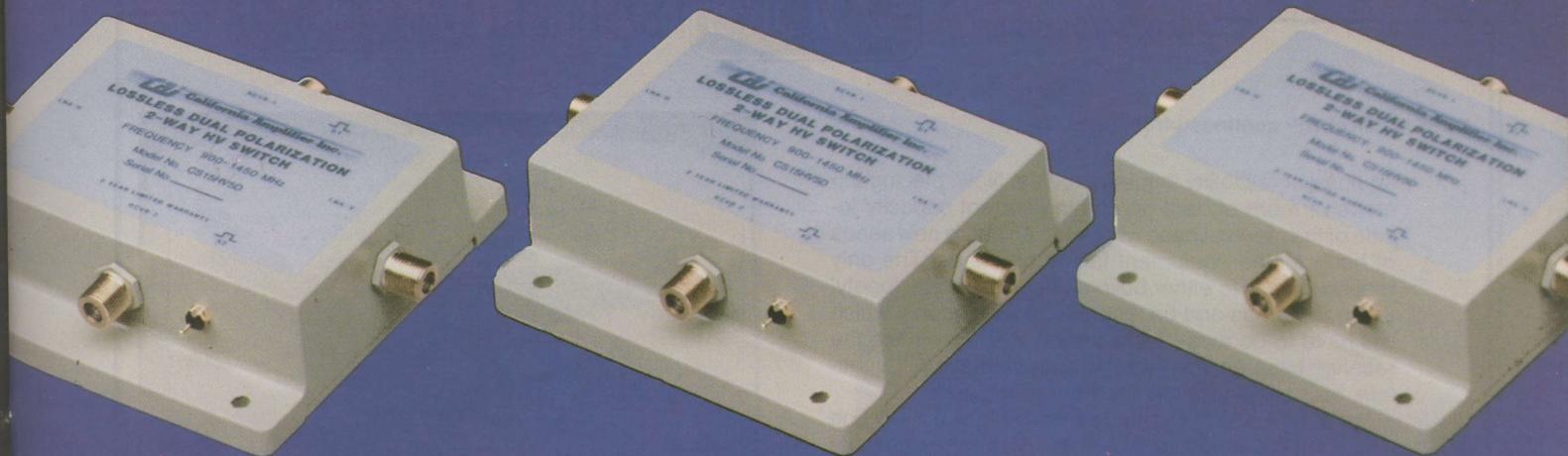
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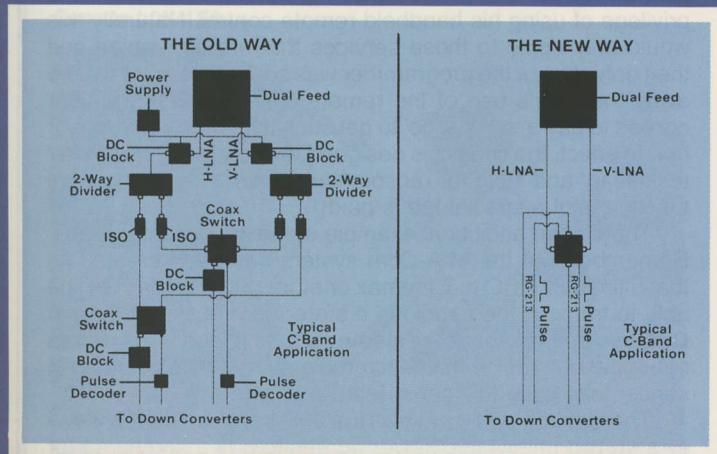
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DESCRAMBLERS/ continued from page 30

equipment reliability immeasurably. Now, placing 2.5 amps or more of heat generating current capacity inside of the receiver case will create an entire new series of heat related equipment failure problems. The only real solution is to either build a totally separate, 'beefy' (as in 2.5 amps and up, capable) power supply which will have to go **away from** the receiver, or, make the receiver case-enclosure large enough that it will 'ventilate' properly and allow the heat to escape.

In La Jolla, M/A-Com offered that 'conversion' of existing receivers to packages which would be IRD/M' compatible "might cost between \$2 and \$15 per receiver at the OEM level."

These and other mechanical and electrical considerations aside, there are other 'OEM interfacing problems' facing any prospective user of the IRD unit. Off-shore producers, for example, have a special problem.

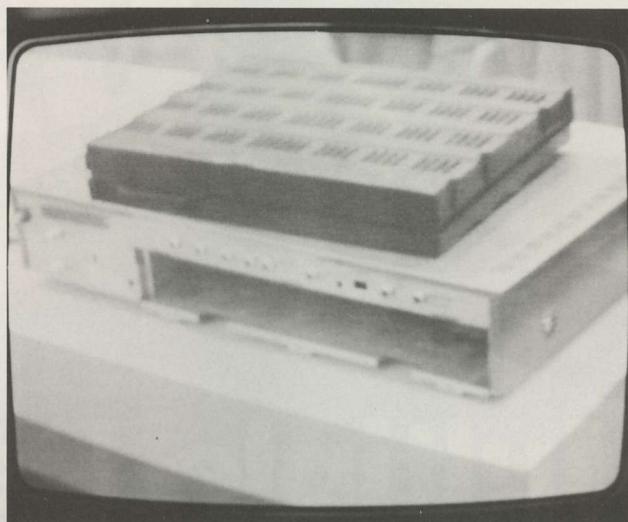
M/A-Com maintains that because the system's encryption coding is based upon the NSA 'DES Algorithm' system, that none of this technology can be shipped overseas (Canada is an exception). That means that while US manufacturers could buy from Linkabit 'test sets' which would allow their production line and test people to test the IRD (or 'E' series) units in their own plants, **overseas manufacturers cannot do this**. Uniden, for example, would be forced to build their receivers with IRD capabilities and then ship the receivers to the USA where the IRD units would be retrofitted and the whole package tested. M/A-Com continues to maintain that individual receivers which have abnormal differential gain, differential phase (et al) characteristics will NOT WORK with the descramblers and they foresee each individual receiver being production line tested **before** it leaves the factory **with** an appropriate Videocipher test set.

To get US manufacturers 'started' down the road to the eventual M/A-Com goal of having all receivers compatible for Videocipher, **OEMs** will soon be offered cable family **VC2C** descramblers for use within their plants for R and D and equipment design purposes. The actual arrangement will be through HBO, however, since Home Box Office is the programmer providing the 'secured' programming at the present time and therefore is the operation that must authorize such VC2C use (see **CSD/2** for April 15th for a description of the VC2C unit).

ULTIMATE Control

Perhaps the most important thing to realize with the Videocipher system is that the system has been designed to provide maximum flexibility to one or more programmers. As long as **one programmer** is using it exclusively, all '56 tiers' of programming control are available to that programmer. When two programmers are using the same system (i.e. two separate companies such as HBO and Showtime), the options not only are cut in half but the system 'demands' a certain amount of cooperation between the two (competitive) programming firms. They must share the same control circuits and they must also share a certain amount of subscriber information.

Linkabit has attempted to anticipate as many different 'revenue sources' for the programmers as possible. Each time you can divide up the programming day (week, month) into smaller and smaller bits, you have a new potential revenue 'stream.' Making every program available on a 'pay per view' arrangement (where **each program** must be selected by the customer **and paid for as viewed**) is one direction for revenue



VC2000M or 'IRD' unit (black enclosure on top) **weighs some 2 pounds and installs into receivers that are designed for it.** No, **OEMs cannot purchase these units to build their own 'E' series packages!** (Photo courtesy WIV-TV)

production.

The 'genius' of the Linkabit goes further than that, however. An example. Let's say the customer has purchased a Birdview receiver system and he has a handheld remote control (infrared). He or she has grown accustomed to using the handheld remote control since it allows full control of the system from the easy chair.

M/A-Com, however, is telling receiver OEMs that when they layout the revised receivers for the integration of the IRD/M' package that in the 'dialogue command lines' between the IRD and the receiver proper, the receiver must 'break' into the infrared (or other) remote control line so that the remote control can **only be used** IF it has been authorized for use by an appropriate signal sent by the programmer.

Why?

Linkabit figures that maybe some programmer at some time will want to charge the consumer **EXTRA MONEY** for the privilege of using his handheld remote control. Naturally this would only apply to those services that are scrambled and then only apply if the programmer was so 'heartless' as to take away the user's use of the remote control unless the user agreed to pay a 'surcharge' to get such use returned to him or her. In effect, the system is designed to allow the programmer to 'kidnap' and 'hold for ransom' the viewer's remote control function until a special fee is paid(!).

There is an additional example of the 'genius' of Linkabit. Remember that the M/A-Com system has been created so that ultimately HBO or Cinemax or other programmers will be able to transmit their audio in a stereo format. As we saw in **CSD** for April 1st, there are stereo outputs (L and R) as well as monaural outputs on the descramblers. The VC2000E and M series units have this same feature built-in.

The Linkabit system allows the uplinker to **turn off a viewer's stereo** unless the viewer agrees to pay a surcharge for the stereo service. In other words, Linkabit is handing to the programmer an effective tool to help them pay for their upgrading to stereo because each time a viewer opts to watch a stereo movie **in stereo**, the viewer will be agreeing to pay an extra charge for the stereo service.

This series will continue in the May 15th edition of **CSD/2**.

COSTA RICA TVRO

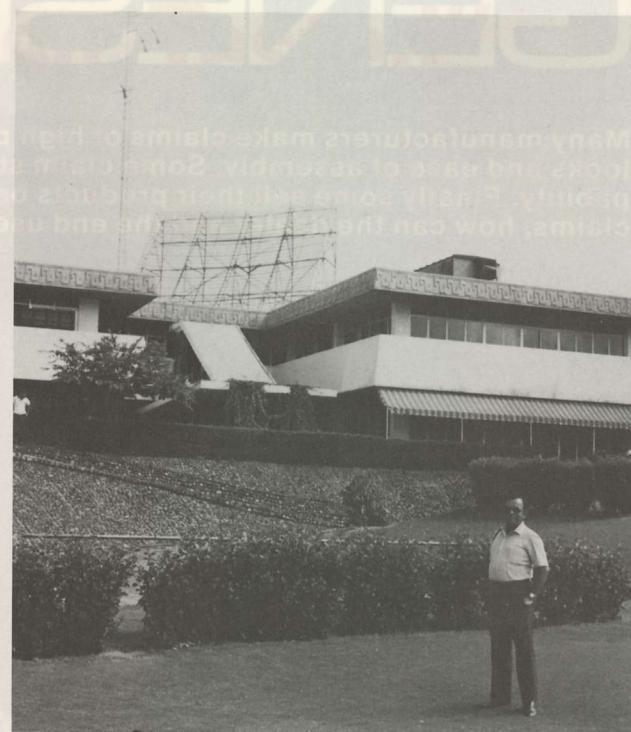
At General **AT&T** in New York, we have a technical study being prepared for a group of business people interested in creating satellite fed cable television systems in and around San Jose, Costa Rica. I had heard the same stories others have heard through the years; that Costa Rica was **already** plugged into satellite television, and that several, large, cable systems already existed here. I was surprised to find an excellent level of technical expertise but no **major** cable or other American satellite TV distribution in place. This is a brief report on my observations and on my analysis of the opportunities presented in Costa Rica for expanded distribution of US satellite signals for compensation. This report will address only the technical aspects of the concept and leave the legal questions to others.

While there are undoubtedly a significant number of TVROs in Costa Rica, the two major practitioners of the art are a **Mr. Mora** and an engineer named **Eric Roi**. Mr. Mora was the gentleman who sought me out and who asked for advice

by
Jan Spisar
Spisar Engineering, Ltd.
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WHEN the author is not lounging in the Costa Rican sun on vacation, he spends idle hours setting lumber on fire at his Canadian home with his 6 foot 'solar furnace,' and storing the coals for a mid-winter bar-b-que.



NOT A BILLBOARD/ this 30 foot high by 42 foot wide spherical reflector has three feeds mounted on the tower to the left. It serves the Hotel Cariari as well as approximately 1,000 private homes nearby. Excellent pictures from F3R, W5 and G1.

on creating an expanded cable service.

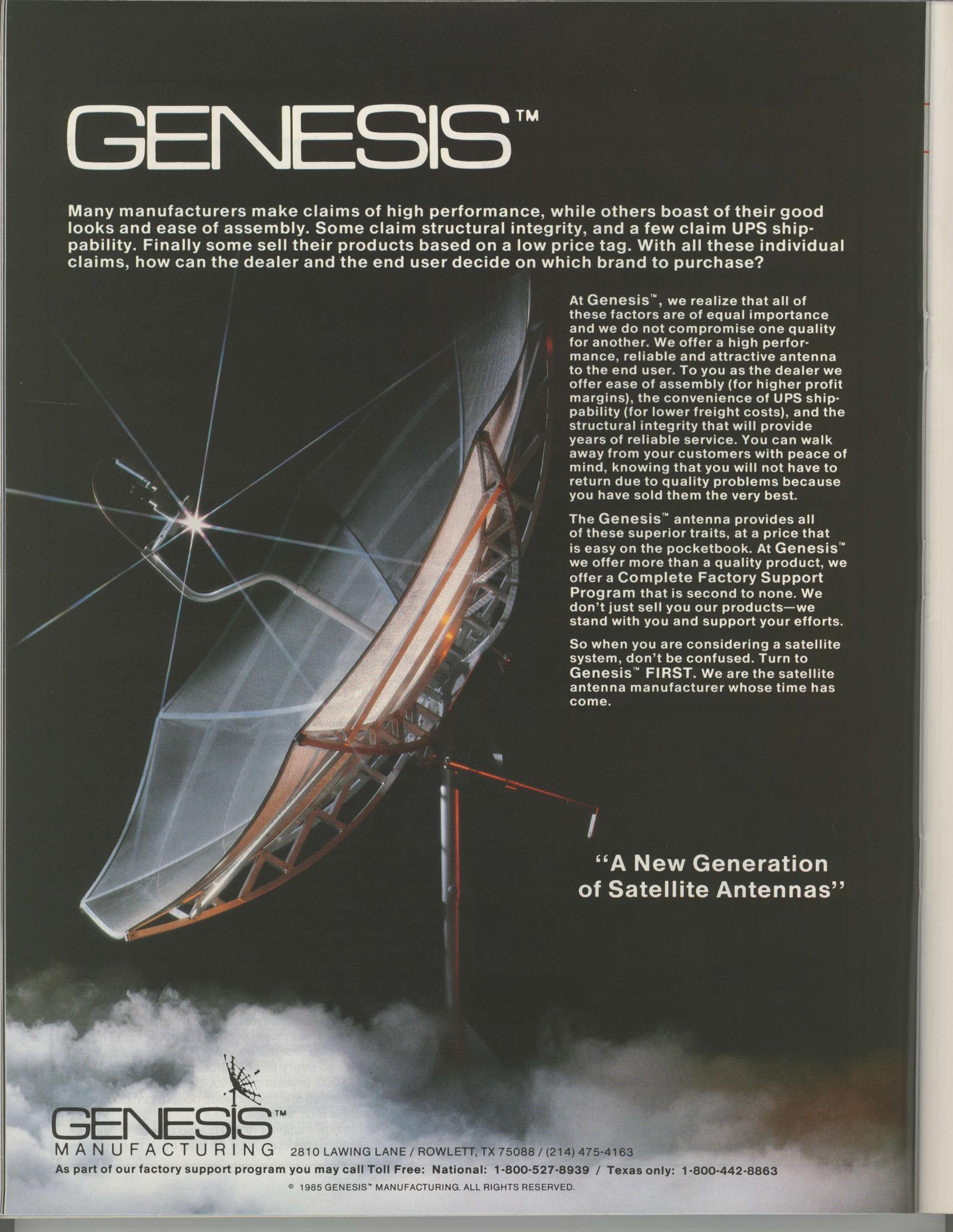
At the present time Mr. Mora has created, apparently on his own, a 27 foot parabolic antenna which he has installed on top of the roof of his **Hotel Musoc**. The antenna was designed by a Mexican engineer, **Retriga H. Pozas** of Monterrey. The antenna has a polar mount suspension and a significant number of support ribs. Unfortunately, in building this antenna, the designer overlooked how it might be installed. Mounted atop the Musoc Hotel it is virtually impossible, less a stable helicopter, to adjust the feed in and out or to seat it at the proper focus point. It is my opinion that this antenna has not been optimized although it does provide reception.

A nearby installation is also mounted on top of a hotel. Local engineer Eric Roi designed and built the 30 foot wide by 42 foot high spherical reflector which has separate, individual feeds for G1, F3 and W5 satellite feeds. This **Hotel Cariari** installation sits at about 8 degrees north and 83 degrees west and the best service channels are from F3(R). The technical manager for the system, **Kenneth Murillo**, told me that the system had been constructed and turned operational for an investment of around \$60,000 (U.S.). The system is a commercial venture and Mr. Murillo is presently serving more than 1,000 homes with what he characterizes as a 'mini-CATV system.' The system presently carries six channels, selected to represent a broad spectrum of programming interests, from the three satellites. The system services both the hotel rooms and some 1,000-plus homes nearby. The charges are \$20 (U.S.) per month so every three months or so it regenerates the original \$60,000 investment. Not bad as a return. It is amazing what talented and courageous people can do in what is basically a high tech science.

The systems now installed (there is also a second Eric Roi spherical antenna measuring 30 by 30 feet) have been opera-

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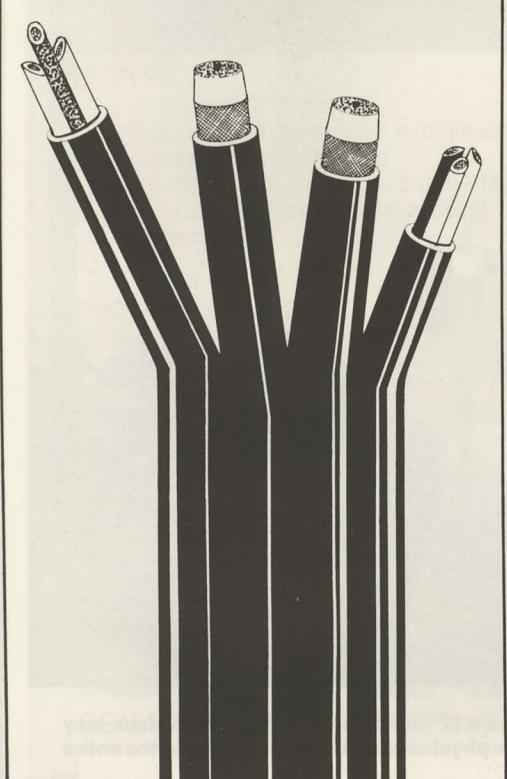
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YOU CAN SEE why it is virtually impossible to get out to adjust the feed on Mr. Mora's 27 foot antenna. While the surface may appear sound in this photo, the antenna is simply too heavy for its mount and there are physical instabilities throughout the entire installation.

tional long enough that there is a broadly developing business interest in expanding the distribution of American satellite signals in Costa Rica. Several different technologies are being studied carefully.

In the town of **Alajuela**, for example, some 20 kilometers northwest of San Jose, we have the almost perfect setting for a traditional cable system. Alajuela is a compact, highly dense community primarily made up of middle class residents. The \$20 per month fee, now established in San Jose in the 'small' cable system operating there, is 'do-able' in a community such as this.

Prior to my arrival, Mr. Mora had been focusing on the possibility of creating one or more **UHF** TV band **scrambled** transmissions to serve the residents of San Jose. The San Jose situation is more complex than compact Alajuela, however; the city is large and contains well scattered middle and a few upper class residential regions. Cable would have to thread its way through significant poorer housing areas as well as industrial districts where there would be very little if indeed any revenue base. Mr. Mora felt the only way to reach those pockets of potential subscribers was to broadcast the signal thereby skipping over the regions with no potential users. There are presently six VHF television stations in San Jose and no spectrum space is available for such a scheme at VHF. Of course as readers of **CSD** are well conditioned to now, most if indeed not all of the presently available over the air scram-

bling systems suffer from either high maintenance costs and problems, or a low level of security. Mr. Mora is aware of these limitations and has also explored the US approach of MDS. Here, however, there is a shortage of available equipment for what he would like to make a six or greater channel transmission system (most MDS systems are 1 or 2 channel only and equipment readily available is so designed).

I proposed to him that tests conducted by **CSD** in the Turks and Caicos, using a broad banded FM over-the-air transmission system (see **CSD** for November 1983) might be the appropriate solution.

Any system built will have several hurdles to overcome, none of them particularly technical.

Export Value: There is a real concern about draining local cash resources **out of** Costa Rica. All of the business people I spoke with talked of 'irresponsible capital drain,' meaning of course that there is a high consciousness about retaining dollars **within the country** and not sending them abroad.

Political Considerations: This is not a project which is likely to get off the ground if funded and owned by **non** Costa Rican investors. The country has a reasonably good history of independence and there is a concern that 'national resources,' which would include the broadcasting spectrum, not fall into non-Costa Rican hands.

Local Economy: Believe it or not, there is a start of an

Satellite Total Control Cable

TYPE 1

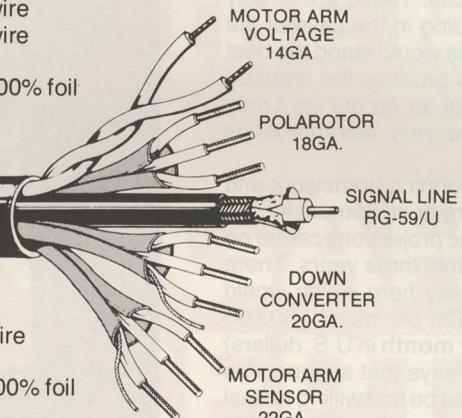
2 conductors #14 ga.
 3 conductors #22 shielded w/drain wire
 3 conductors #20 shielded w/drain wire
 3 conductors #18 shielded
 1 RG-59/U—20 ga.—60% braid—100% foil
 with type 3 black polyethylene jacket
 for direct burial

TYPE 2

2 conductors #14 ga.
 3 conductors #22 shielded w/drain wire
 3 conductors #18 shielded
 2 RG-59/U—20 ga.—60% braid—100% foil
 with type 3 black polyethylene jacket
 for direct burial

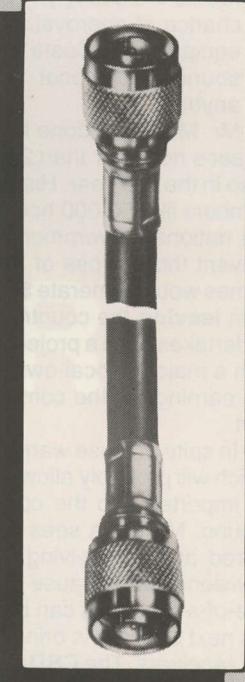
TYPE 3

2 conductors #12 ga.
 3 conductors #22 shielded w/drain
 3 conductors #20 shielded w/drain wire
 3 conductors #18 shielded
 1 RG-6/U—18 ga.—60% braid—100% foil
 with type 3 black polyethylene jacket
 for direct burial



TYPE 4

2 conductors #12 ga.
 3 conductors #22 shielded w/drain wire
 3 conductors #20 shielded w/drain wire
 3 conductors #18 shielded
 2 RG-6/U—18 ga.—60% braid—100% foil
 with type 3 black polyethylene jacket
 for direct burial



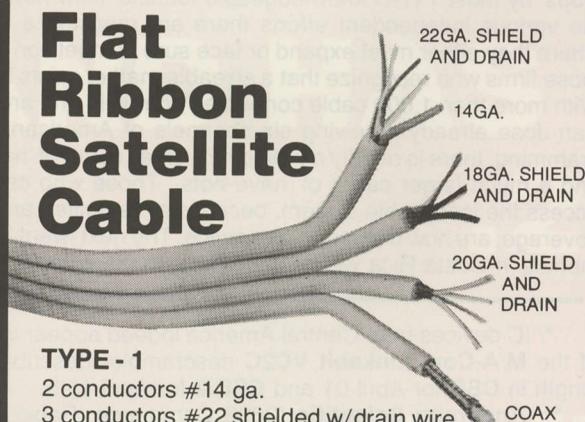
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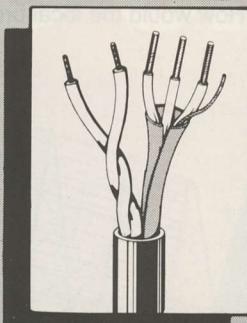
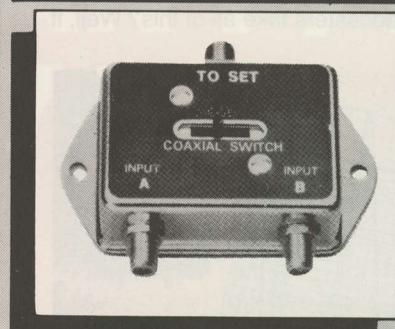


TYPE - 1

2 conductors #14 ga.
 3 conductors #22 shielded w/drain wire
 3 conductors #20 shielded w/drain wire
 2 conductors #18 shielded w/drain wire
 1 RG-59/U—20 ga.—95% copper braid

TYPE - 2

2 conductor #14 ga.
 2 conductor #20 shielded w/drain wire
 2 conductor #18 shielded w/drain wire
 1-RG-59/U—20 ga.—95% copper braid
 1-RG-6/U—18 ga.—95% copper braid



electronics industry here assembling various IC devices and other small electronic appliances. These are largely for export to other countries, including in the case of the ICs, to the USA (*). A project like this would stand the best chance of approval if it intended to produce the required equipment in Costa Rica. This is not as 'far out' as it may sound since local labor rates are very advantageous anyhow.

Mr. Mora has done his business planning homework and he sees no fewer than 20,000 receivers or customers in San Jose in the first year. His more optimistic projections center on numbers like 50,000 homes served within three years. There are national government policies at play here which would prevent those types of revenues (at \$20 per month, 50,000 homes would generate \$1,000,000 per month in U.S. dollars) from leaving the country. This simply says that anyone who undertakes such a project seriously must be first willing to deal with a majority-local-owner and then secondly with retaining the earnings of the company within the country for the most part.

In spite of these warnings, there is the start of a policy here which will probably allow the first 1,000 or so 'receiver units' to be imported into the country, just to get the project off the ground. Mr. Mora sees upwards of \$100,000 that will be required at the receiving and re-broadcasting center and he envisions that because most of this equipment will be largely one-of-a-kind, that can be imported to get the system started. His next concern is bringing down the price on the 'FM/satellite' receivers. The CSD tests used the 450-950 MHz band and while this is an attractive plan, it may well turn out that there is an alternate frequency band that can be used in Costa Rica for this purpose which would mandate a separate type of block receiver IF. You will recall from the November 1983 CSD that in those tests the 450-950 MHz output of a block downconverter was amplified and then connected to a transmitting antenna for re-transmission, without interconnecting cables, to homes on Provo. The initial CSD tests were run with very low power (less than 1/1000th of a watt) but recent equipment developments in this field (**) now makes powers up to ten watts practical, at least in the 450-950 MHz band. With this sort of power level, significant line-of-sight distances out to 20 miles and more are practical.

How would the local broadcasters take all of this? Well, it



LOCAL Channel 6 uses this 30 foot by 30 foot spherical to receive off-bird signals from G1 and F3R sources. Local viewers enjoy American programs as well as recent US movies.



MR. MORA would like to be the 'Satellite TV King' of Costa Rica but he needs sound technical advice from knowledgeable experts in this field. He has the assets to 'play' in this field (bus line, hotels, large farms, etc.).

turns out that at least one local television station, with a 30 by 30 foot spherical, is routinely receiving programming from F3R and G1. These programs are taped and used typically in the late evening/early morning hours for regular broadcast by the local (channel 6) TV station. So they are already 'in the satellite business' taking not only English language movies but either or both of the Spanish language feeds from G1 on a daily basis.

Most of this has been kept quite quiet for several years since Costa Rica is not one of the more frequently visited 'tourist stops' by most TVRO knowledgeable tourists. Now however the various independent efforts there are reaching a point where they either must expand or face sure competition from those firms who recognize that a sizeable market exists here. With more than 1,000 cable connected homes in and around San Jose already receiving six channels of American programming, there is rapidly developing a small cadre of 'haves' and a much larger cadre of 'have-nots.' Those who cannot access the local cable system, because of its limited area of coverage, are now clamoring for service. The next twenty-four months in Costa Rica will be interesting to observe.

*/ IC devices from Central America indeed appear inside of the **M/A-Com Linkabit VC2C** descrambler described at length in **CSD** for April 01 and **CSD/2** for April 15th.

/ **Anderson Scientific (2693 Commerce, Rapid City, South Dakota 57702; 605/341-3781) is now routinely producing 1 watt and 10 watt broadband transmitting power amplifiers covering the 450-950 MHz band. These amplifiers are driven by a standard (high quality) BDC unit outputting in the 450-950 MHz band and provide through-the-air distribution of FM format signals for reception on home-mounted UHF receiving antennas connected to Anderson ST2000 series BDC receivers. In this way, distances to 20 miles can be covered with 12 or (they claim) 24 channels of satellite service allowing the headend or single antenna to be 'shared' by an unlimited number of 'ether-connected' receivers.

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pictured here combines versatility
and performance no other
6-foot satellite antenna can match.



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Opens New TVRO Markets . . . Solves Installation Problems Bigger Antennas Can't.

Sure you've had good success selling 8, 10 or 12-foot satellite antennas. Sure you've heard about six-foot models. And you might be leery. Maybe even convinced (without ever trying one) that reception quality isn't good enough to satisfy your customers. Let's set the record straight.

Does a six-footer work as well as a "ten" on all satellites and on all transponders? The answer is no. Is it true that some six-footers work better than others? Yes. Like the Winegard Mini-CEPTOR with an unbelievable F/D of .278.



Winegard's Mini-CEPTOR™ is designed and manufactured to the same precision standards as our 10-ft. perforated aluminum "deep dish."



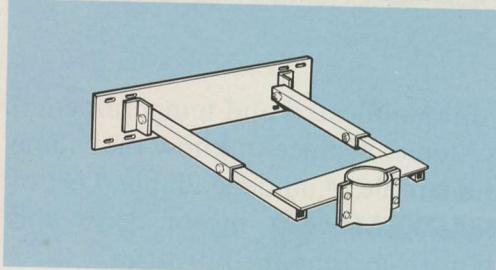
Model RF-1000
Patent Pending

In test after test, in all parts of the country, the Winegard Mini-CEPTOR pulled in beautiful, clear pictures on most satellites and on 50 channels or more. Yes, there were minor sparkles on a few transponders, but good, watchable pictures nevertheless.

So what are we saying? How can you sell a six-footer against a ten? The answer is, you don't.

The Winegard Mini-CEPTOR has a niche all its own in the home satellite market.

1. Many folks would like satellite TV in their homes but simply don't want a big, obtrusive dish. The small Winegard Mini-CEPTOR, with its perforated aluminum see-thru construction, is probably the least obtrusive and most aesthetically pleasing satellite antenna on the market today.
2. Other home owners simply don't have yard space for a large dish. The Winegard Mini-CEPTOR solves this problem.
3. In some cases, you can't get a good "look angle" without installing the dish above roof height. The Mini-CEPTOR also solves this problem. It can easily be mounted on a ground-up pole mount (see photo). Its small size and light weight (22 lbs.) mean easy installation and far less wind loading than a larger antenna.
4. There are plenty of consumers out there who will be amazed and pleased with 50 or so satellite channels with good, watchable pictures from a small dish. All they need is a live demonstration.



Adjustable Winegard bracket attaches to roof edge or side of house, allowing easy "ground-up" mounting of Mini-CEPTOR on standard 2-1/2-inch pipe.

So if you've had hang-ups about trying - and selling - six-foot dishes, try the new Winegard Mini-CEPTOR. And, if you're already selling a six-footer, give Winegard's a test. It will soon become an important, profitable part of your product line.

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The control features a lock-lamp system designed to make programming simple. That means you'll save installation time. And its circuit design prevents memory loss due to power failure. The 36 volt motor drive features two adjustable limit switches for safety, 1500 lb

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And it's easy for your customer.

Interchangeable, illuminated index tabs correspond to sixteen programmable selector switches, making this control extremely easy to comprehend, and even easier to operate.

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- Vert/Horz Push-Button
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- AFC Push-Button
- Video Invert Push-Button
- Slide-Rule Tuning
- TV CH 3-4 Modulator
- LNA/Down Converter Voltage-Retained

And, the attractive slender design of the SR-1500 will make it a welcome addition to any family entertainment center.

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SATELLITE MUSIC NETWORK 5.58-5.76 THE ROCK CHANNEL 7.38-7.56
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This receiver offers exceptional video quality in the most user-friendly satellite receiver on the market. It requires no training to master. It operates with a block down converter and comes with infrared control with a built in dish drive.

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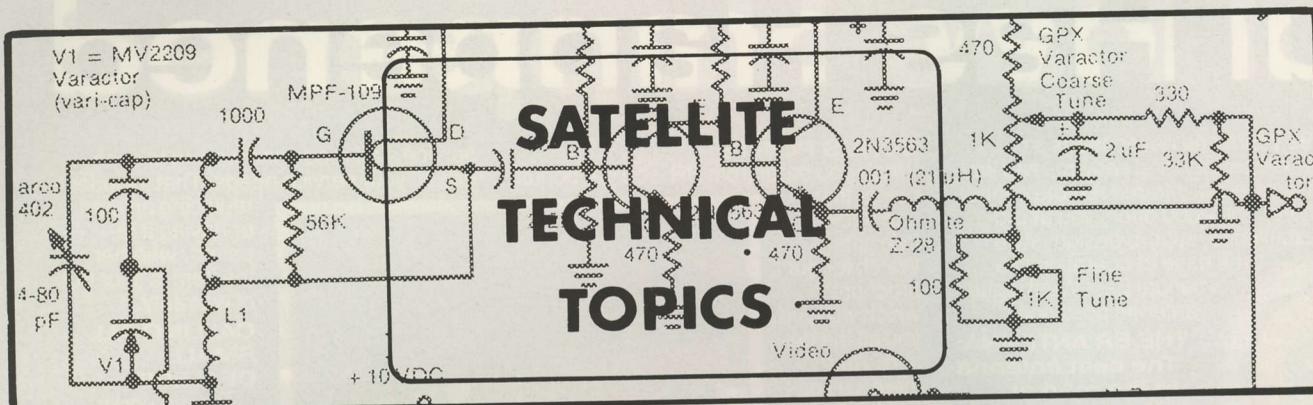
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In the March 01 issue of **CSD** we published a letter from the owner of an IQ-160 TVRO system in Virginia. He was experiencing problems with the polarization changeover with his IQ-160 system and had run out of places to turn for assistance. His dealer had given up, Intersat told him the problem was the fault of Omni-Spectra and Omni-Spectra said the problem was the fault of Intersat's interfacing. '**We said**' that we would be pleased to publish 'problems' and where available solutions, and, to reward those who took part in the project. There is a growing trend towards marrying component parts from different manufacturers to create a full system. **Not all of the potential problems** associated with interfacing non-compatible parts are anticipated by the designers of individual component units. The dealer is left with sorting all of this out and sometimes he runs into problems he cannot solve. **CSD** sees the need for the exchange of such problems, and solutions and offer this space accordingly (*).

Dennis Dority of Star-Tec, Inc. (314 S. Broadway, Salina, Kansas 67401) is our first 'winner'. Dennis provides a response to the Virginia problem with the IQ-160 and our check for \$50 is on its way to Dennis.

"I have 13 (IQ-160) systems installed and they work great! That does not mean that I didn't have problems (however).

"One possibility is the wiring from the downconverter to the Omni. I accidentally put the ground wire on the wrong pin at the downconverter so I had voltage running from vertical input to horizontal input (which should be ground) each time that vertical was selected. When horizontal was selected, the mis-wiring placed voltage to the ground input and it came out of the horizontal pin running backwards. I don't have any idea what this does to the Omni but the **important point** is that this made my vertical reception look fine **and my horizontal reception was lousy**. That was when I discovered that an unpowered Omni will create fine reception on one polarization but not on the other (which one depends of course on which way the feed is turned on the buttonhook).

In another case, I had problems with oxidation or corrosion on the spade connector provided on the Omni. To correct this, I now solder the wires directly to the Omni and do not use the spade lugs at all. This corrected a second installation **that had the same problem**; i.e. poor reception on one polarization and good reception on the other.

Time and time again I have proven to myself that a good, solid connection is very important with the Omni and I would suggest that this is the first place to look for a solution to the Virginia problem. Additionally, if the feed is not adjusted properly, you can also see a badly polarized version of the horizontal side **without voltage** to the horizontal pin.

"The IQ-160 IS a critical system to install and the installer cannot cut corners on it. The dealers need to be above average in technical abilities to handle them. I love and hate them at the same time."

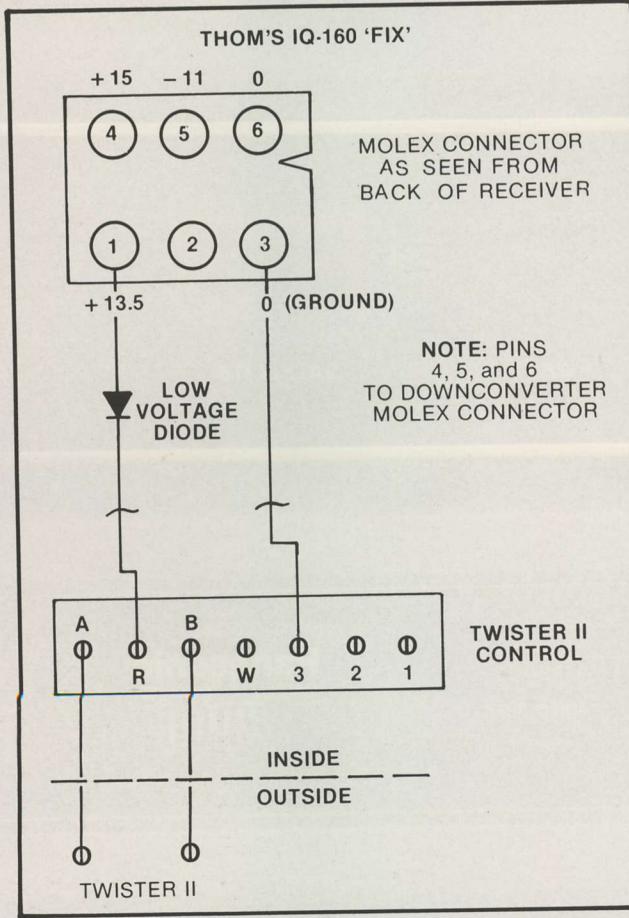
David E. Thom of Daves Antenna (5360 Holley Byron Road, Holley, N.Y. 14470; 716/637-5620) is our second 'winner' this month and he provides another approach to the original IQ-160 problem. Our check for \$50 is also on its way to Dave Thom.

"I (too) experienced no small amount of frustration with the IQ-160 system using the polarizer provided (from Omni-Spectra). I never did find an Omni-Spectra polarizer which would work to my satisfaction with either the IQ-160 or the General Instrument CRHF receivers; and

worse yet, no two ever performed alike.

"It is my subjective opinion that using a pin-diode polarizer with **this system** is an unfortunate combination, and after repeatedly testing the Omni on our shop system, I chose not to install any so equipped. (I happen to have a large stack of Omni devices for anyone who is interested!) Instead, I use the **Chapparral Twister II** with a control interface which I shall describe. I believe this substitution makes the difference between a mediocre system and a very good system, and eliminates the problems reported in **CSD** for March 01. A standard **Polarotor I**, with controller, may **also be used** if you are willing to accept a slight sluggishness when changing transponders and a more critical 'skew' adjustment.

"To use the Twister with the IQ-160 system, some minor wiring changes are required. The six pin Molex type connector on the back of the IQ-160 and CRHF receivers is for outgoing voltages. Pins 1, 2 and 3 are for polarization control and pins 4, 5 and 6 are for the down-converter, LNA powering and the tuning line voltage. Pins 1 and 3 are

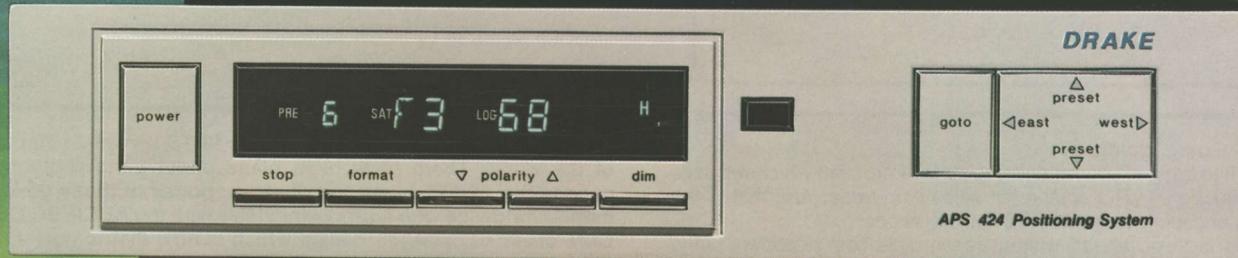
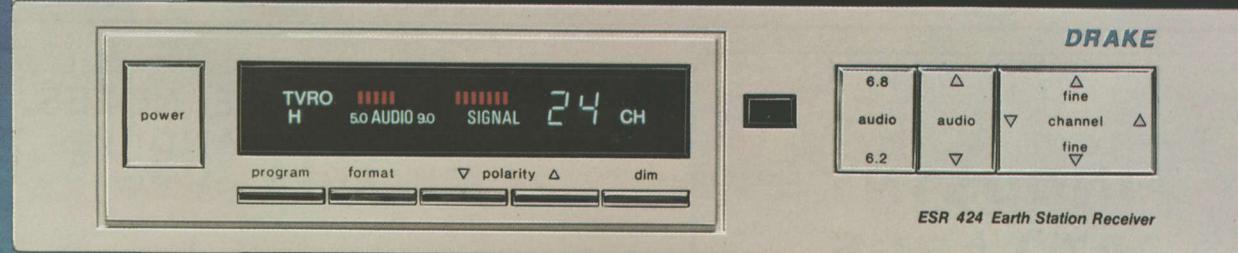




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**APS
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An entertainment team that is second to none: the Drake ESR424 Home Satellite TV Receiver and APS424 Programmable Antenna Positioning System.

The ESR424 receiver offers you the choice of either economical single conversion or convenient block down conversion. Both models feature the solid dependability of microprocessor design. With the easy-to-use infrared remote control, the Drake ESR424 is a natural for any home satellite TV system. Extra features like audio channel seeking and an innovative fluorescent display combine for unbeatable viewing pleasure!

The APS424 programmable antenna positioning system charts a new course in control technology. Simple programming allows easy entry and selection of satellites. A one-button command will move your antenna to the desired position through the dependable power of the APS424 motor drive. The APS424 is also controlled by the same infrared remote used with the Drake ESR424 Receiver!

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utilized when using the Twister and Pin 2 is left unconnected. The output from pin 1 is wired to the **negative** side of a low voltage diode and a lead from the positive side of the diode is run to terminal **R** on the Twister control. The output from pin 3 is the receiver ground and it is connected to pin 3 on the Twister control. Output terminals **A** and **B** on the Twister control are run **directly** to the two connections on the Twister itself (**NOT** through the Molex connector on the downconverter, as is the case with the Omni device).

"A 'skew' adjustment is provided on the Twister II control interface. It is indeed unfortunate that the designers of the IQ-160 system brought out a 46 button hand-held remote but neglected to consider the need for polarity 'skew' compensation. Here in the Northeast, in particular, a lack of skew in the control functions does indeed compromise system performance. **This solves that problem.**"

* / You can earn an additional \$25 to \$50 yourself by providing field technical information to **CSD Technical Topics**. If you have a unique problem which you have not been able to resolve, send a full description to CSD covering the brand, model and type of equipment as well as the problem itself. Those problems accepted for publication will earn **\$25** for the person submitting the problem. If you have either a problem AND a solution which you feel is unique, or if you have a solution to a problem you see published here, send it along and if accepted for publishing you will earn **\$50** for your submission. Address all problems, and solutions, to **CSD Technical Topics, P.O. Box 100858, Ft. Lauderdale, FL 33310**. In the event of similar or identical problems or solutions, **CSD** will accept the problem or solution which is 'best stated' in writing or by the earliest postmark, as appropriate.

INDUSTRY AT LARGE

AFRTS/ Going, going, . . .

I wish to bring to your attention a serious problem which will have some effect on TVRO equipment sales worldwide. And that is the pending encoding of the AFRTS transmissions.

If this is to go ahead without reasonable cost decoders being available, countless thousands of United States citizens, **apart from the military**, would be deprived of the only reliable source of news and sports information from home, which they now have access to.

In Papua, New Guinea there are countless U.S. citizens living here who have access to AFRTS television. And this includes missionaries as well as government assistance program volunteers from the USA. I could cite numerous examples of how reception of AFRTS has changed the outlook and lifestyles of those in isolated communities all over the Pacific. For example, there is the 80 year old Bishop who came here from Kansas and who gets great enjoyment from the US news as well as the sporting events. Because of his age, his movement about is restricted and his **US** television offers him one of the few comforts he can now expect from life.

And there are countless businessmen in this industry, worldwide, whose income depends to some degree on the freely available service of AFRTS. The encoding of AFRTS will have a profound adverse impact on the sale of equipment overseas and this will ultimately reflect back to the suppliers in the United States. I am hopeful that the Board of Directors of SPACE will take the time to understand how great the impact has become from the FREE availability of US programming, through AFRTS, overseas. I would further hope that SPACE would adopt a position of supporting the continued unscrambled distribution of AFRTS by pointing out to those in control of the system that US taxpayer dollars are also paid by those US citizens who live overseas; even those who are outside the military.

John Morgan
Sales Manager
HITRON Pty Ltd.
P.O. Box 539
Goroka, E.P.H.
Papua, New Guinea

John has pioneered satellite television in New Guinea and in surrounding areas in the Pacific. He knows first hand the impor-

CORRESPONDENCE, NOTES, REBUTTALS AND CHARGES . . .

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tance of maintaining an unscrambled AFRTS service in that part of the world. There have been plans under consideration to encode the AFRTS feeds, largely in response to those governments worldwide who feel uncomfortable with the ABC/NBC/CBS/CNN 'brand' of open journalism which is now distributed worldwide on AFRTS. To keep 'political peace' with those governments, the US military has agreed to consider scrambling of these feeds to prevent the very people John cites as dependent upon the news from continuing to receive it. Arthur C. Clarke would be ashamed of such a tactic and we would agree with him. Will SPACE try to do anything about it? Only if enough people yell loudly enough.

HARD Data Information Sought

Whom do I contact for information to receive the stock quotations in REAL time? Our customer has a 4 GHz terminal and is interested in subscribing to a real time service. His interests include NYSE, ASE and NASDAQ. Any help would be appreciated.

Jim Lynch
H & L Electronics, Inc.
105 Swift St.
S. Burlington, Vt. 05401

Reuters is the only survivor to the best of our knowledge. The 15-minute-delayed service from FNN is educational but far too 'slow' for a serious investor intent on making bucks on 'the margins'. Can any reader help out Jim?

WESTERN Canada Perspective

I am a broadcast engineer with an extensive background in microwave communications and radio and television transmitters. I have been working as a maintenance engineer and design engineer for a local engineering firm for the past several years. Furthermore, I have owned the 'first privately owned TVRO' in the Saskatoon for the past five years. During that period of time, I have constantly upgraded my terminal to keep it modern with changes in technology. And I have been a subscriber to **CSD** since the early days and with the **CSD Anthology**, I have every issue ever published. Thus I feel qualified to pass judgement on some of the happenings going on in this field, especially here in Western Canada.

The Best TVRO Filter Just Got Better!



Our PFG-series filters have solved thousands of terrestrial interference problems for dealers. That isn't enough for ESP. We made improvements for even better results.

New! Three important advances make them even better.

Now, there's a bypass switch for channels that are unaffected. So you only use the filter on transponders affected by terrestrial interference in the 4GHz band. We've also added an adjustable gain control (-2dB to +4dB) for optimum performance.

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Once you try this filter, you'll wonder where it's been all along!

ESP INC.
2532 Regency Rd. Lexington, KY 40503

I have been following with great interest the articles in **CSD** and **CSD/2** regarding HBO (and other) proposals to scramble; in "the very near future." Additionally, we have also been 'exposed' to all of the public relations hype about ALL satellite signals being scrambled. Even the prestigious Canadian Broadcasting Corporation (i.e. CBC) fell for the scrambling story as related by the Home Box Office public relations department in a recent edition of 'CBC Marketplace.' They (HBO and CBC) announced to all CBC viewers that "within two months it would not be worth owning a satellite dish" as ALL signals would be scrambled and there would be NO DECODERS available in Canada, nor to Canadians, for American (scrambled) signals. This had the effect they wanted; dish sales slowed down dramatically overnight.

You may not be aware, but last November the Canadian Radio and Television Commission authorized the Saskatchewan cable TV operators to stop getting their US (network and PBS) programs from North Dakota, and to switch to the Detroit signals. As you are aware, the Detroit signals are transmitted on Anik D by Cancom, scrambled by the Oak Orion system (see **CSD/2** for 3-15-85; editor). This effectively tripled Cancom's subscriber base, possibly saving the firm from pending serious financial problems. This means that for those of us living in the regions served by the Saskatchewan cable systems, we are now receiving our US network (and PBS) programs via a descrambled service. In the past several months, the period of time when this system has been operating, the system has failed several times. When this happens, the un-decoded signals pass through to the cable system and we are treated to scrambled Cancom service until the cable people get around to repairing the breakdown. There have been periods of up to 8 hours when the pictures stayed scrambled and nobody at the cable firm responded to correct the problem.

This is primarily a 'local' problem, but the circumstances are amplified by recent changes in Cancom uplink scrambling 'software' which controls the descrambling of the Detroit (et al) signals.

I am bringing this to your attention to illustrate that with ANY scrambling technique, ultimately it is the customer who suffers. **Murphy's Laws** tell us that anything built by man can fail; and that it will, usually, at the least opportune moment. We also both know that any 'tampering' with a video (or audio) 'waveform' to make it 'scramble' always results in inferior video (and audio) quality after the signals are unscrambled. I know that these people selling this hardware make statements about 'video processing enhancing' the image or audio processing 'improving' the signal to noise ratio. That is nice talk for a couple of guys sitting quietly in a laboratory using a secure, test-bench test-system. I defy them to make those same statements **after** the descrambled video and audio has passed through a 60 amplifier CATV plant cascade! I must assume that the people promoting all of this modern technology either do not care what really happens to the signals, or, they calculate that the average paying customer won't care or be able to detect the signal degradation that is inevitable.

Bob Seaborn
2601 Dufferin Avenue
Saskatoon, Saskatchewan
S7J 1C7
Canada

When Oak first brought out their Orion system, they had the usual start up problems. The first users were fight promoters and others who wanted to serve individual arenas where the public paid money to sit and watch a major event. On more than one occasion, the scrambled service was cut-off and unscrambled signals came up on satellite because when the fight or event began there were several locations around the country which could not make the signal descramble. Rather than risking a riot at these locations (fight fans are there for a fight; right?) the uplink operator/promoters simply cut off the scrambling.

We are anxiously awaiting the first such event in cable. Let's say that HBO promotes a blockbuster movie and millions of TV sets are tuned in. These HBO customers have changed their family schedule to be in front of the tube for a 'big event.' Parties have been cancelled, dinners cut short; everyone has built their evening around the scheduled movie. And the uplink scrambler craps out or a major cable system such as San Diego with a quarter million homes finds it has VC2C descrambler problems.

Will HBO take it on the chin and leave the scrambling on; or will they pull the plug to save their PR?

Cable's problems are just beginning and it is comforting to know that they have this experience ahead of them.

As for the CBC attempt to scare Canadians out of buying TVROs, Coop Comments on this really dumb move in this issue.

SATRON Changes

Our BC 1000 block downconverters have been updated in a new model, the **BC 1020**, for use with Intersat and a few other major manufacturers who have specialized block downconversion requirements. Specifically, we found that we had to insure that the (BC 1020) units had 20 dB of gain, minimum, a reduced amount of LO leakage, additional input 'filtering' and finally improved gain flatness. Anyone with any questions should contact me or Ray Jones, our VP of Engineering.

Steve P. McMurtry
SATRON, Inc.
13130 A 91st Street North
Largo, Florida 33543

SATRON has bucked the trend to offshore produced BDC products and they are currently producing a line of BDC products which seem to be good in performance and fairly priced. It is encouraging to see that there are still some 'Americans' left in this high tech field!

SALVAGING An Old Dish

CSD is excellent in keeping my employees and myself up to date; keep up the good work!

I have a question which perhaps an 'expert' out there someplace can help us with. I recently located an old Prodelin 10 foot fiberglass dish with their (old style) standard, buttonhook feed, sitting in a landfill site! I like the idea of being able to keep the LNA plus downconverter at the **rear** of the dish and this buttonhook type of feed with an open waveguide flange serving as the 'mouth' on the feed certainly has some mechanical advantages. Having everything **behind** the dish also would allow the electronics to be 'locked up' in a box since we are really having problems now with 'electronic thieves' who are running about at night stealing people's LNAs and downconverters.

I wonder, however, about the performance of this heavy brass waveguide as a feed versus modifying the dish with a standard dual feed and feedhorn mounted on a standard feed support. The feed works quite well as it is but it is of course single pole and you cannot rotate the feed unless you mechanically, by hand, twist the entire assembly at the dish.

Pete Griffin
Front Line Communications
4743 S. 116th Street
Greenfield, WI 53228

Memories. Coop used the same ten foot design Prodelin dish in January of 1978 to demonstrate, for the first time, that high quality TV reception was possible using a dish less than 20 feet in size! Some fifty cable TV operators in Oklahoma saw the test demonstration and within 90 days several of them had bought the same ten foot Prodelin antenna and installed it for their cable system use; at a time when antennas this small were clearly 'illegal' in the FCC eyes.

The dish surface is excellent (high accuracy). The buttonhook feed could be replaced with a tri or quad pod mount to hang a dual pole feed or a rotating probe polarizer out in front. Of course if you did this, then you have the LNA (et al) back out in front again. We did see one fellow who somehow motorized that rotating buttonhook feed/waveguide back in 1980 or so but as you might suspect, this would be a mechanical nightmare. We suggest you park the antique on a favorite satellite and favorite polarization and just enjoy it as a backup dish.

16 FOOTER For Sale

I attended the Atlanta, Georgia show in November of 1982 and while there purchased a 13 foot and a 16 foot set of antennas from Vidare in Arkansas. I also ordered a full set of equipment with the plan to sell it as a pair of installed systems. Then my wife died of a heart

The new Isis 55 portable satellite antenna

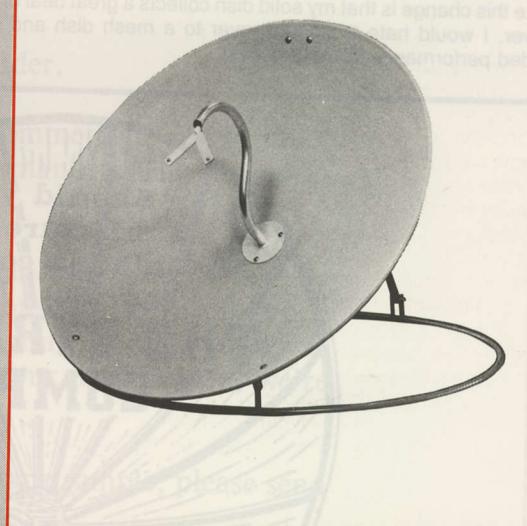
The new Isis 55 dish from Isis Electronics, Inc. is the affordable portable satellite antenna with big-antenna performance. The Isis 55 features a hard-alloy spun aluminum wall, tough enamel finish and low F/D ratio for years and years of crisp, clear satellite entertainment. And the Isis 55 is so lightweight and easy to install, it's easy to take it just about anywhere. Compare the Isis 55 to any satellite antenna, big or small.

Isis 55 Features

- Marine-grade spun aluminum wall with durable stainless steel hardware
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Other Specifications

Diameter	55 inches
Focal length	16.5 inches
F/D ratio30
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Low-loss buttonhook (zinc plated)	
Three-year limited warranty	



For information, call or write:



Isis Electronics, Inc.

P.O. Box 3707, Terre Haute, IN 47803
812-234-4033

attack a month later.

I am offering to sell the 16 foot dish for one-half of what I paid for it; or \$750. This includes the mount, all hardware and the feed mount as well. A new polar mount, heavy duty, from Sat-Com/Fiber Tech near Tulsa is also available; quotation upon request.

Calvin Fuchs
18390 S.W. 232 Street
Miami, FL 33170
(305/248-5891)

Unfortunately, Vidare was never known for high quality workmanship. This 8 piece dish could be an exception to that 'statement' but we would caution any would-be buyer to inspect the antenna carefully before purchase since a 16 foot (8 piece) surface such as this could be the equivalent of a 10 footer.

BIGGER Dish?

I am a consumer with a Kaul-Tronics 112" Stainless steel TVRO dish, a 100 degree LNA and a Chaparral feedhorn. The feed is the Polarotor 1 and the feed is equipped with the Golden Ring. Has CSD done any test of this antenna?

I have a copy of a Paraclipse test report which CSD did do and I was very impressed with your findings. My Stainless dish seems to work OK; it gets a good picture on transponder 6 of F3R, for example, which from reading the Paraclipse review I now understand is a good 'barometer' of dish performance. I have two neighbors with dishes; one is a 12 foot Janeil and the other has a 10 foot Janeil. They have LNAs in the 90 to 100 degree range. My 112" Stainless gets better pictures than EITHER of the Dark Star antennas. Is this normal or is it possible that my dish is simply peaked up better than the Janeil dishes?

I am considering upgrading to a larger dish; a mesh surface dish. My choices seem to be a Janeil or a Paraclipse. My reason for wanting to make this change is that my solid dish collects a great deal of wind. However, I would hate to change over to a mesh dish and suffer degraded performance in the process!

What is your advice?

Lloyd Little
P.O. Box 104
Latham, Illinois 62543

John Kaul has talked with us about submitting a 112" antenna for test several times but thus far has not done so. We would enjoy the opportunity to test it, however, since in theory its spun surface ought to make it an excellent dual band (4 and 12 GHz) antenna if the surface accuracy is good enough. The Paraclipse 12 foot antenna outperforms virtually every other 12 foot antenna we have ever tested. The 12'6" USS/Maspro fiberglass dish is measurably better and the Aristocom 12 footer is almost exactly as good. The Janeil Dark Star antennas have sold very well, but we have never been as impressed with their structural strength as we have with their advertising.

CONFUSED Consumer

I am in the market for a TVRO. And I have been to perhaps ten dealers and I have seen the full spectrum of stuff on the market. I have read everything I can get my hands on. A dealer friend of mine who sells Channel Master allowed me to borrow a copy of CSD to read; your December 01 (1984) issue.

I read it cover to cover; twice. I thoroughly enjoyed all of the articles and from your obvious expertise I would like some help.

Number one: Should I wait until we have REAL scrambling compatible receivers available? It seems to me that at the present time we don't know which are, and which are not, 'scrambling compatible'?

Number two: I would like a system in the \$3,000 price range that will operate with a single TV set but which can be upgraded to use with three TV sets in the same house. Is there such a system?

I have seen everything from Drake to Luxor, STS to Channel Master; you name it, and I have been told "THIS is the best one!!!".

CORRESPONDENCE CONTINUES/ page 58



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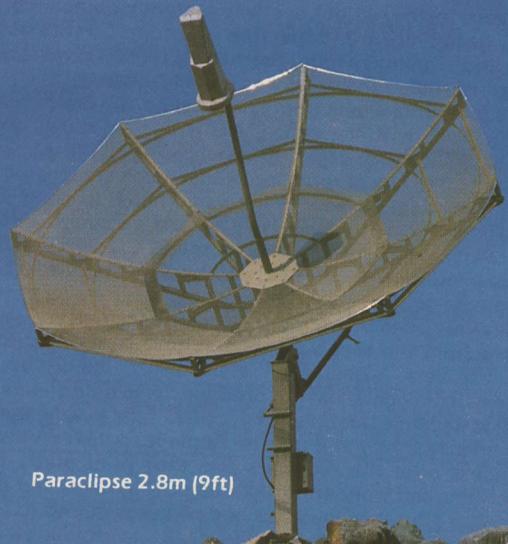
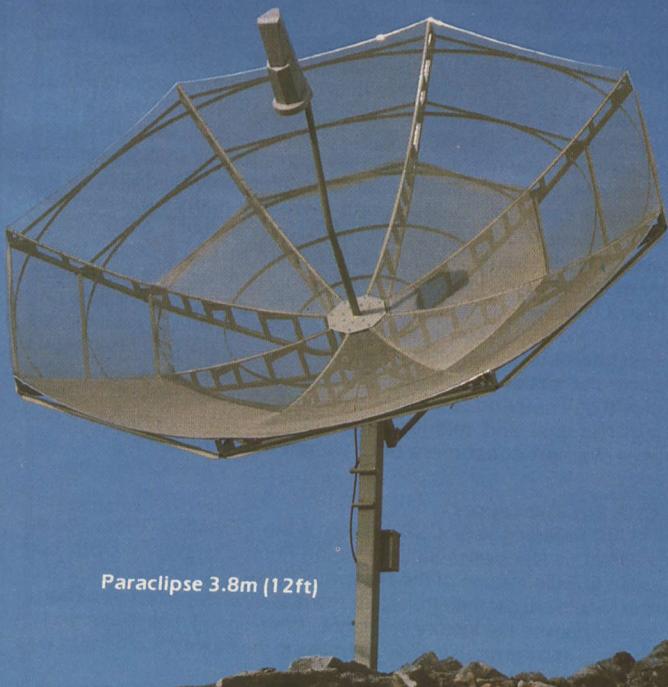
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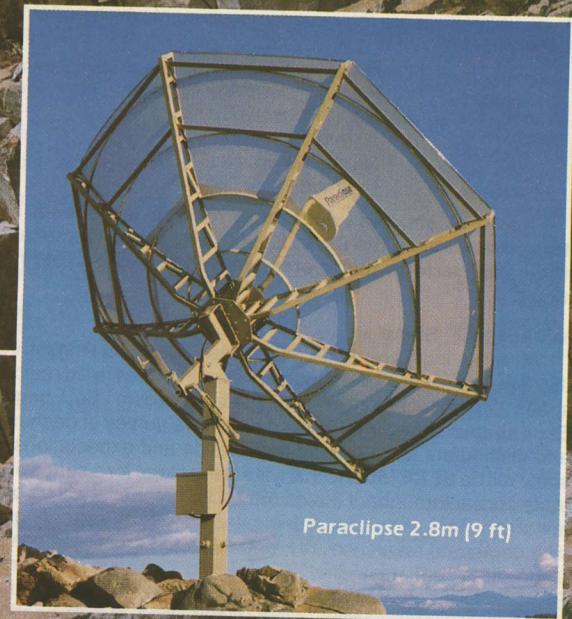


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Mark Fator photographer

CORRESPONDENCE/ continued from page 54

Naturally I am confused by all of these claims; I am certain that not everyone of these people can be right in their statements but how do I tell which one is right?

Herb Sudhoff
Rt. 2
Sparta, Tn.
38583

As a consumer you have no access to CSD routinely so we cannot refer you to CSD2 for April 15th except by mention (we did send Herb a copy, however). That issue revealed that of ten stock receivers tested, all but one was instantly compatible with the VC2C descrambler and the 10th one could be with about \$2 in parts and 15 minutes time. There is NO reason to wait for scrambling compatible receivers; they are all around us!

As for multiple sets from one antenna, the key phrase here is BDC or 'block down conversion.' A BDC system allows one antenna plus its LNA and downconverter (called a block downconverter) to connect up to two or more individual receivers located at two or more individual TV sets in the same home (sharing outside the home is technically possible, but it has some unanswered legal ramifications; this month's feature article on that very subject aside!). Now, this is important: not all BDC systems are supported by the 'bits and pieces' which allow you (or your installer) to provide high quality service to two or more TV sets. Insist that you see the data sheets from the receiver manufacturer describing things like 'signal splitters,' 'signal taps,' 'line amplifiers' before you select a system. If the dealer cannot produce these data sheets, chances are it is because the receiver supplier is not making these important (required) bits and pieces. Some less-than-ethical receiver suppliers offer the receivers and they print pretty brochures describing the wonders of 'shared BDC systems' but they never bother to offer the small bits and pieces required to make such systems work. This forces the dealer to scrounge around to locate parts from other suppliers and these parts may not be of the proper electrical qualities to work as you hope. Absent a totally 'integrated system' with each part designed to work with every other part, you are buying a potential nightmare.

HELP

We are writing to ask that any firms who are manufacturing or distributing TVRO receiver demodulators for C band (3.7 to 4.2 GHz) please contact us. We are now looking at various potential system packages for export into the West Indies as well as to other areas of the world and we are interested in equipment which performs exceptionally well.

R.P. Rajkumar
Radio Masts, Ltd.
North Portway Close
Round Spinney
Northampton, NN3 4RQ
England

Radio Masts, Ltd., according to their letterhead, manufactures antennas in the 0.5 to 22,000 MHz range (some range!) and they also perform tower erection and antenna system installations.

NON-SPACE Show

After leaving North American Trade Shows last August, I came to the decision that the TVRO industry certainly does need regional trade shows with a higher degree of professionalism. So I began **Anza Expositions** after conducting an extensive survey of dealers, OEMs, and distributors to determine their needs and expectations. My first show will be **SESE '85** and this will set the stage for a series of regional trade shows throughout the country. Our emphasis will be on educational seminars and we have dedicated our efforts to creating agendas with depth and relevance. We would like to have these seminars be 'accredited' but have met with strong negative resistance from SPACE. This bothers me since I believe that education is the key to creating an industry which is capable of lifting its participating members out of adolescence and away from that old and tired 'get rich

quick' mentality into one of maturity and dedication to doing professional installations with adequate dealer backup. What advice can you offer?

Diane Agenbroad
Director
ANZA Expositions
P.O. Box 5201
Bend, Oregon 97708
(503/389-7032)

Readers just missed the first of the **SESE '85** shows; held April 29 to May 1st at the Red Lion Inn at Portland, the show charged participants \$35 for three days. Advice? Stay out of the show business; run these affairs as intensive educational seminars concentrating on teaching dealers what this industry is really all about. Pick three distributors in each region of the country where the sessions will be held and let them sponsor the affairs. No other exhibits or exhibitors; work strictly with the distributor sponsors and let them get you technical support from their OEM suppliers to make the sessions educational. Those 'This is how a feed works' crap-sessions that end up pushing one brand of product over another will not help a dealer stay in business. What would help is to load the sessions with at least half of the agenda dedicated to three to five person round table discussions featuring old-timer, established dealers who are willing to share their experience and expertise with the newcomers. Manufacturers educate for only one reason; to sell more product. Distributors are a bit better but they usually limit their 'educational materials' to the products they sell. Dealers, and there are many now who can handle education, are the natural people to teach other dealers what it is all about. Trade shows that are run as we used to run them in 1981 are now out of step with the times. We have more than 3,000 full-time mature, successful dealers out there now and THEY should be the ones doing the educating. And it is in their own best interests to educate the newcomers; even the guy opening up down the street from them. If the newcomers get smart, faster, they'll quit causing established dealers so much grief by spreading irrational and mis-leading 'facts' to consumers. We can't expect smart consumers until we get smart dealers.

ONE For The Gipper

After reading your **CSD** testing of the **COSMOS II** receiver developed by Northwest SatLabs in the February issue of **CSD**, I decided to write for one of the receivers. When it arrived I hooked it up and I could not get their Polarotor process to work correctly so I had to send it back to the factory in Oregon. Within one week it was back in my shop and it is more than 2,000 miles to the factory; each way. I was impressed.

The receiver had required some minor adjustments and now with it back, it works beautifully. The video and audio is great; in fact of the six brands of receivers which we carry for resale here (and they are all well known brands), we believe the **COSMOS II** has the cleanest video and one of the best audio systems we have ever sold. Not only is it simple to operate, it is small, compact, and its price as compared with some of the other products out there is a bargain.

And let me say this about the service; Northwest SatLabs takes an interest in your problems. Jeff Smiley of Northwest called me on the telephone after I had sent the receiver in and talked with me twenty minutes to find out what, exactly, was my trouble and he carefully explained the receiver's operation to me. So excellent service, excellent video and audio, and a reasonable price; you cannot go wrong with a company like this when you are a dealer. Thanks to Coop for the initial **CSD** review and the recommendation. **This one is a winner.**

Dr. Leslie Jones
M. Satellite Sales
410 South 1st Street
Marion, Il. 62259

We agree; Northwest still has the 'sleeper receiver product' in the industry. Smiley told us 30 days after his review appeared that he had heard from around 40 new firms spread from South



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 - CONSUMER SATELLITE SYSTEMS, Noblesville, IN 46060
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 - UNLIMITED SATELLITE, Madison, WI 53716
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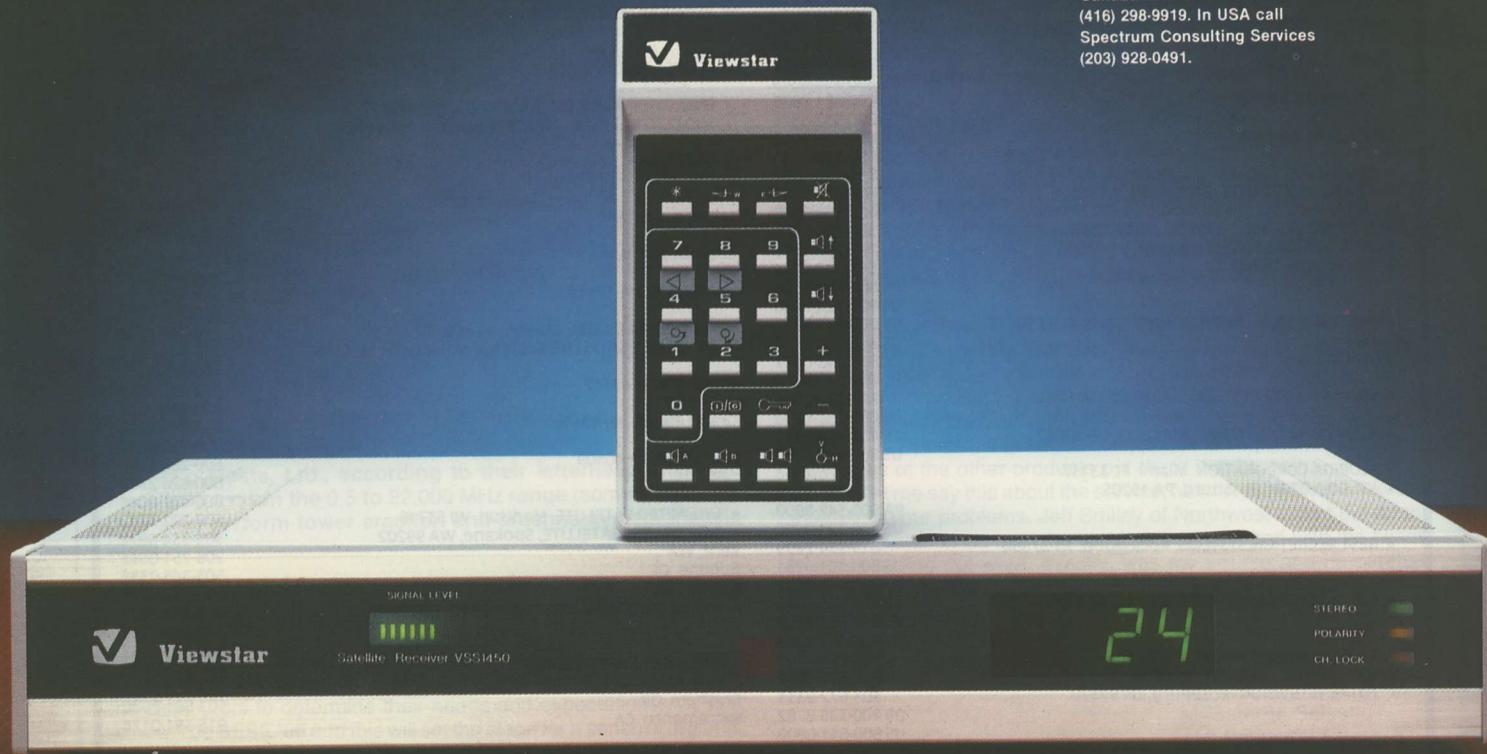
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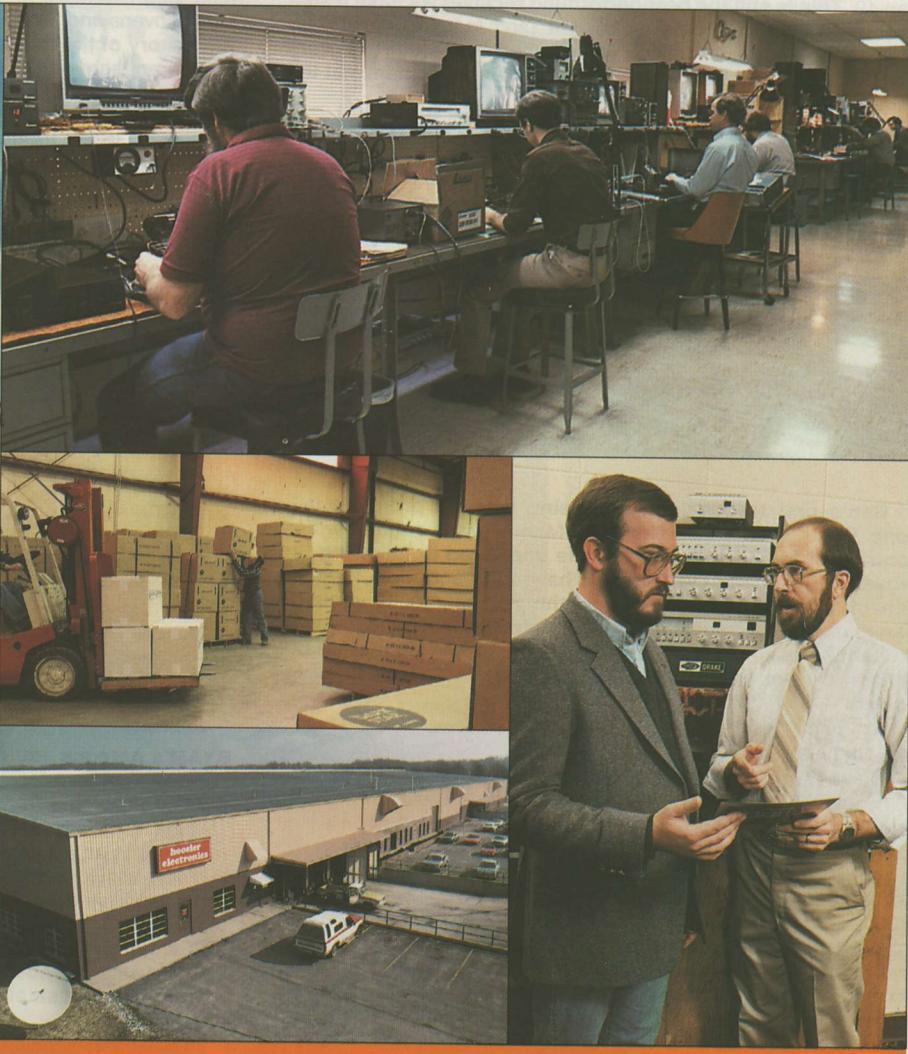


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CORRESPONDENCE/ continued from page 58

America and the Pacific to here 'at home' about handling the receiver. He was pleased; but that should have been 400 rather than 40. This is still the best performing receiver we have tested to date and on our super-important (and marginal) ABC/CBS feeds in the Turks and Caicos we replaced our \$1,800 receivers with these \$450 range jewels and got better performance at the same time.

ANOTHER Canadian Effort

Satellite Symposium '85 will take place at the Skylane Hotel in Toronto, Ontario July 1-3. The symposium will feature many of the major 'players' from the US and Canadian TVRO industries as speakers. The trade show is being staged by **SIGNAL**, a new Canadian trade magazine for TVRO in Canada. I would be happy to answer questions from anyone in the industry who is interested in participating in this Canadian show.

Ben Schaub
Editor, **SIGNAL**
Satellite Symposium '85
Box 238, Station D
Scarborough, Ontario
Canada M1R 5B7
(416/759-6639)

Ben's first issues look promising and are professionally done. CSD Canadian Bureau Chief Mark Lewis is a major writer/contributor for **SIGNAL** and anyone interested in following the growth in Canada of TVRO should have a subscription. Perhaps Schaub is bright enough to avoid the problems past would-be Canadian show promoters have run into and while the industry probably does not need 'another show', Canada certainly deserves to have one of its own each year. Good luck to all involved.

VOLUNTARY Support

If there are now 800,000 TVROs operational in the USA, this sort of 'people consortium' should be strong enough to 'wield a little power' in the marketplace. This is not a new suggestion but perhaps it is time to 'renew' the thinking involved.

Let's everyone get behind a single service; just one, single service. I happen to like **SelecTV** since they have stayed out of the HBO 'scrambling wars.' Now, let's encourage, coerce, or otherwise intimidate every dealer to see that he in turn does the same thing to every customer he has. **And let's all start sending \$5 a month to SelecTV.** Sure, we'd have freeloaders and we'd have people who would not get 'the message' but think of what an impact we WOULD HAVE if 100,000 homes started sending \$5 a month, **voluntarily**, to SelecTV! If we did this without being told we **must do it**, we'd get their attention and we might also get them to sit down with us as an industry to work out some industry-wide plan to insure that their service did not **ever go scrambled**.

If such a sit-down-and-negotiate plan resulted in 250,000 homes then doing the same thing (\$5 a month to SelecTV) the firm would have an additional \$1,250,000 to work with. I don't know how many paying subscribers they presently have but I am willing to bet that at the 250,000 level, we'd just about double their income!

If the entire industry got behind a plan like this, if every OEM stuck a sheet of paper in every box explaining what we are doing as an industry and WHY this is important to our long-term survival, I am willing to bet that in a six month period we'd turn this HBO thing around. All we **really** need is **ONE** unscrambled, high quality service up there with movies. We could avoid all of this hassle concerning scramblers and receiver compatibility and the efforts of M/A-Com and HBO to slide in under the rug. We could simply ignore them and they would quickly get the message!

What does it take to get something like this started???

C. Byam
Earth Stations, Inc.
Windom, Minnesota 56101

Every concept has a 'time' when it will work. Twelve months ago, six months ago . . . maybe one month ago this would have

been a 'cute' idea. Now could be the right time. If it is a good idea, **SPACE** should immediately embrace it. If it is a good idea but **SPACE** does not embrace it, then it becomes harder to 'sell'; but not impossible. After some 'fine tuning,' we could endorse it. The next step would be for David Wolford and Chris Schultheiss and Lloyd Covens and John Ponce (other publishers) to also like it. In the history of the industry to date, we have never had all of the publishers agreeing to anything. This could be an opportunity to break that mold. Try **SPACE** first; if that fails, assuming the concept DOES have merit, start writing letters to the rest of the publishers in the industry.



BYAM's Antenna 'lot' in Windom.

SMATV Problems Continue

First let me say that I have been a subscriber to **CSD** for some 30 months. It is an extremely informative publication and no one in this business should be without it. Now, the enclosed letter to **ESPN** is self explanatory. And it is typical of the 'state' of the SMATV business today.

I am a physicist by training. I eased into this business from a 'hobby' vantage; "eased" is probably not a good word here when referring to the satellite TV business. 'Hairy' would be more appropriate!

Today, it is virtually impossible for a SMATV operator to place programming into a **small** apartment complex because of something called 'minimum-per-headend-fees'. I have discussed this problem with several programmers and their answers are virtually identical; **'it costs us as much to deal with a small complex as with a large one'**. I can certainly understand that fact. But perhaps the problem is with the 'technique' of billing.

Right now the programmers insist on billing us on a **per-system** basis. The logical approach to this, I believe, is for the programmers to bill us as '**SMATV operators**' rather than as individual SMATV undertakings. Then it would cost the programmer no more to invoice and keep records for a single community with 1,000 subscribers than it would cost to keep the same data flow going for an 'SMATV operator' who had 20 systems, each with 50 subscribers.

There is a gross injustice in the present situation for the small landlord. The small SMATV operator has the same problem and ultimately so does the tenant of a small apartment complex. I happen to believe that anyone living in a small complex should have the same 'legal-rights-of-access' to these program services as someone who lives in a large complex or within a community served by cable. If the minimums-per-headend (complex) were changed to minimums-per-operator, then any SMATV operator with a reasonable total subscriber base could provide programming to any size complex at the same identical programming cost. And then everyone would have equal access, at the same cost, to the same information. The cost to the

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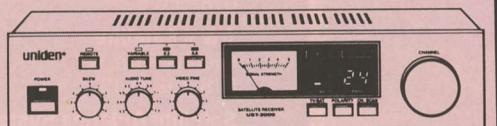
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programmer would not increase but his own subscriber base (and his total income) probably would increase. The magnitude of the present disparity is significant and I illustrate:

- 1) If a 24 unit apartment wants to provide ESPN, WOR, and WGN 'free' to tenants, then the charges are:
 - Overall charge for ESPN is **\$100 per month**
 - Overall charge for WOR is **\$100 per month**
 - Overall charge for WGN is **\$8.33 per month**

That is a total of **\$208.33 per month** for three satellite delivered signals. And divide that by 24 tenants and you have **\$8.68 per-tenant per month**. A not insignificant figure for three essentially advertiser supported service channels.

- 2) If a 1,000 unit complex is provided the same signals 'free' of charge by the landlord, then the cost per tenant or apartment becomes:
 - ESPN / **\$0.20 per tenant**
 - WOR / **\$.10 per tenant**
 - WGN / **\$.10 per tenant**

And that is a total cost of **\$0.40 per-tenant per-month**; as versus **\$8.68 per-tenant per-month** for the people living in the smaller (24 unit) complex. The little landlord is being forced to pay 21.7 times as much per tenant as the larger landlord. Hey, this is America; is this right????

There are a tremendous number of 25 to 100 unit complexes spread all over the country. They would **buy** SMATV systems and they would **buy** SMATV programming and **give** it to their tenants to increase their occupancy levels . . . if the **costs were not prohibitive**. They presently find that they cannot compete with the larger complexes because of the loaded costing structure in favor of larger complexes. So this then becomes their 'justification' for 'stealing' the service channels. **They need those signals to stay in business** because people have now come to 'expect' some measure of satellite delivered programming.

I think this should be a first-priority activity for SPACE to address. Or would we be better off trying to form an independent committee to go after this one on our own? Oh yes, I am not yet a member of SPACE as an SMATV operator for one very simple reason; their dues structure is so high that it (again) favors the larger SMATV operator. In fact, my present SMATV income is less than the dues would be to join SPACE!

J. Harry Mortenson
President
CYGNUS Corporation
3930 El Camino Real
Las Vegas, Nevada 89103

Well written. This very subject, coincidentally saying almost the exact same thing and coming to the exact same conclusions, aired on BORESIGHT during February when we had SMATV operator Greg Heifner of Columbia, Missouri on the air with us. A solution? Well, as much as we are against federal action to set rates, we think it may be appropriate in this instance. There are ways for SMATV operators to negotiate with ESPN (for example) or to join a coalition of other SMATV system operators to get more favorable rates but perhaps we are approaching this **ass-backwards**.

People in rural areas have the same basic telephone rates as people in metropolitan areas. Why? Because the FCC sets the rates to insure that the same quality of service is provided uniformly to all citizens. The satellite system is much more 'democratic' than the telephone system since it reaches the rural or outlying apartment complex with the same efficiency as the bigger in-city complex. So the higher rates, defended by ESPN et al, are an internal bookkeeping or accounting problem; not a true 'cost of providing service' problem. It is amazing to us to realize that it **costs ESPN far more to 'administer the account' than it does to 'provide the service'**. That's akin to taking 1 cent a gallon oil and selling it at the well head for \$1.00 a gallon because you have to keep records that are so complicated that the record keeping drives the product cost up 656%!

Will SPACE do anything about it? Think hard; how many SMATV people are on the SPACE board? Now, how many of the SPACE

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members are SMATV members?

We have a better 'free-enterprise' solution here. Let's give SPACE 90 days to do something constructive (this is May 1st and the clock is ticking). Now, on August 1st if nothing has been done, drop us a note again Harry. We'll take the problem to a selection of hardware OEMs who stand to gain the most if the SMATV business problems are promptly and properly resolved; guys who manufacture the kind of equipment you use by the truckload when you wire up a complex. And we'll do our best to talk them into funding an independent effort to take this problem to the FCC since they have the most to gain if this problem is resolved. We obviously can't expect a hundred guys like you, who are earning so little in SMATV at the present time (because of this problem), to fund something like this.

How do we do it? Let's start by scaring the 'minimums' out of the ESPN-type people. We'll go to the FCC and make a strong case for federal rate regulation of all satellite programming charges. Equal charges for equal folks. Between the use of American tax payer dollars to fund this whole thing at the start and the 'first amendment rights' of people in rural areas to enjoy the same programs at the same costs as folks in the big cities, I think we can win. And the possibility that we would not only WIN but force the ESPN type folks to manage their rates under a utility-type regulated environment should scare the you know what out of them. They might even agree to change their techniques, as you suggest, before we get the FCC up in arms on this issue. August 1st; OK?

ON TOP of TI

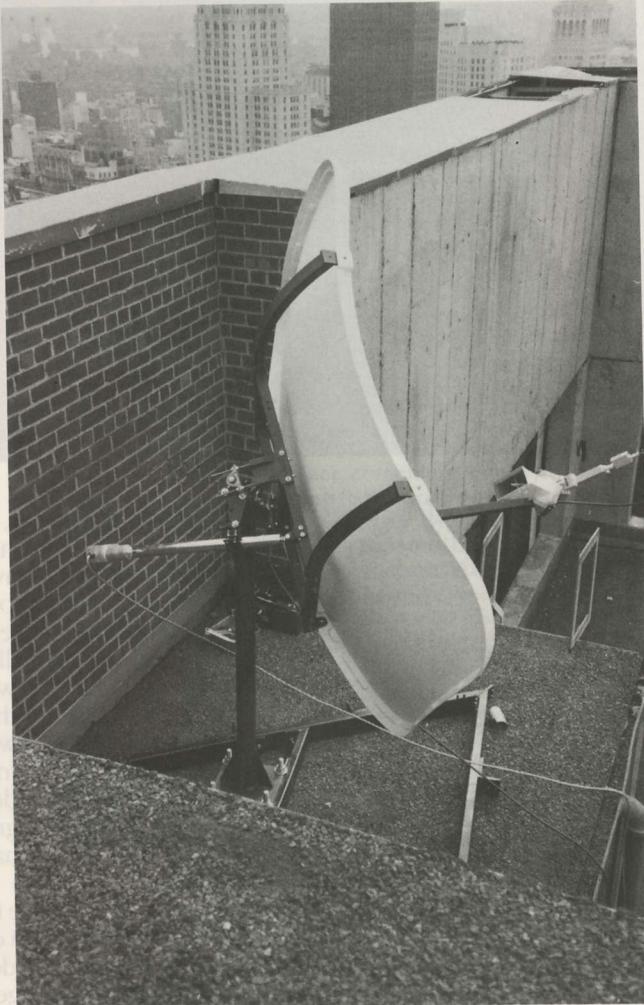
Here are some extensive testing results from our evaluation of the



PICO Kid (4 by 7) antenna done under what I would describe as 'difficult conditions.' We installed this new antenna in the heart of New York City and we engaged the services of **J.D.F. Communications** in Mineola, New York to analyze the probability that we would get ANY pictures with this dish given the low look angle, heavy TI, and other negative factors. I am VERY impressed by this new offset-fed dish product and believe that the industry will see many more adaptations of offset fed antennas in the coming year.

Peter Sutro
MPI Satellite, Inc.
P.O. Box 769
Bernardsville, NJ 17924

That tiny spec on the lower right of the photo is the PICO Kid and the giant building behind is of course the Empire State Building. The people at J.D.F. did an excellent job of critiquing the antenna and found 16 interfering TI carriers present at the site. With filtering they were able to clean up transponders on Galaxy 1. Much of this, they claimed, was due to the clean 'sidelobes' on the PICO Kid and the -23 dB sidelobe suppression. Offset-fed antennas have a place in our growth and as TVRO marches into more and more suburban situations we are going to have to be increasingly intelligent about selecting antennas which do more than create 'bulk gain'; control of unwanted sidelobes is actually more important than maximizing gain. When you can get both to happen at once, you have a winner.



AND the 'other view' of the PICO Kid installed for NYC tests.

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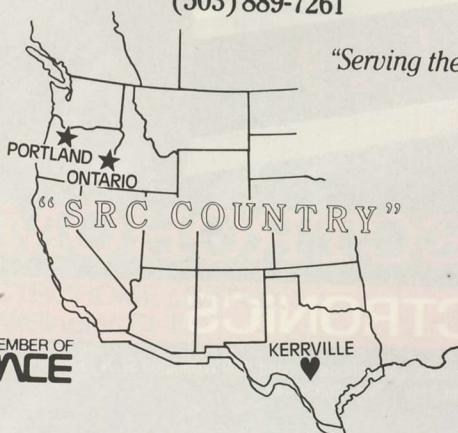
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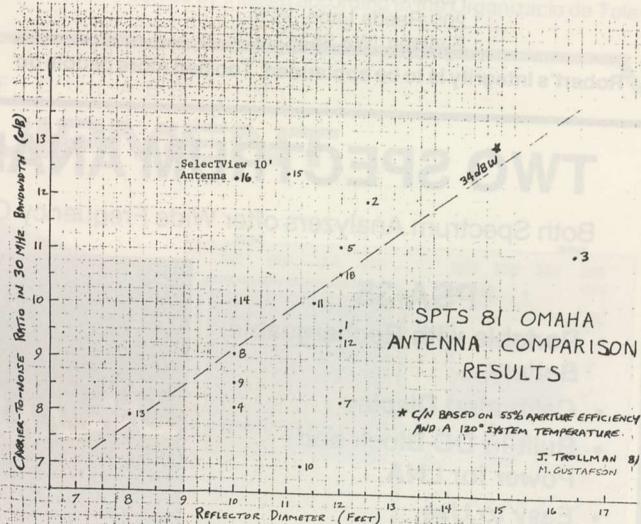
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RECOGNIZE A Winner

I hate to admit this but it took me six months to find enough time to read the October (Anniversary) issue. Allow me to congratulate you on an outstanding chronicle of our industry. I found your narrative interesting, easy to read, well paced and 'generally' accurate. There was, however, one statement which bothered me; "Some of the well known antennas such as ADM were best of (size) class . . .". A number of our dealers have mentioned to me that 'Coop said' (that) ADM 'won the Great Omaha Antenna Shoot Out.' I recognize that Coop did not say, exactly, that. I would like to remind you that our 10' SelectView antenna (which was #16 in the test) clearly won the (total) contest when size was factored into the results. Furthermore, when 'Shoot-Out Number Two' took place in Fort Worth at the next test-show, we attempted to prove our credibility and reliability by going in as a 'blind entrant.' By that I mean that we asked one of our distributors (Darrel Van Kirk of Precision Satellite) to allow us to borrow back one of our antennas which he had hauled to the show, for sale. This was a fully production run antenna, unknown to us as to its manufacture date or pedigree. This was dish number seven (7) in Fort Worth and once more a clear 'winner.'

Let me make clear that I have no quarrel with what CSD for October of 1984 said; I only wish to point out which antenna was consistently the top performer. I am enclosing copies of the 'Shoot Out' results. Now, I wish somebody had the GUTS to do what you did for the industry in Omaha and Fort Worth and encourage head-to-head competition for the equipment available today. Keep up the good work and the great magazine!

James L. Baber, Jr.
General Manager
VPC/Valley Products Corp.
Valley, Nebraska 68064



THE .4 f/D SelectView dish measured a C/N of 12.3 dB using the standard test system when equipped with a Chaparral 'Super Feed.' They are number 16 on the test results.

The VPC antenna was, indeed, 'the best of all' when you factored in the antenna size against the efficiency of the antenna. The chart here shows, as James indicates, that in Omaha (for example) their 10 foot had a higher carrier-to-noise ratio (best pictures) than all other antennas save one 11 footer. Note that the VPC 10 footer had measurably better CNR than virtually all of the larger antennas; up to and including a 16.5 footer. The 11 footer was an ADM, by the way, and it was 'best of (size) class' as we recalled in our October issue.

Guts? It doesn't take guts to do the right thing. It just takes common sense. The 'common sense' is that if antenna testing reveals which antennas are truly the best performers, then the hundreds of dealers who are on hand making buying decisions

on what antenna products to carry would **NOW** have a real set of handles to judge antennas by. You might anger a half dozen antenna manufacturers in the process (although participation in the tests was optional and nobody had to submit their antenna for testing) but even they benefitted because for the first time each knew just how good (or how bad) his product really was and he could then return home to do something about it. We believe antenna tests should be done by at least one show per year and we'd go further than that if we had anything to do with shows again; we'd also test receivers (with their downconverters and LNBS) using the same approach to determine which receivers **REALLY** were best, given all of the trade-offs possible with bandwidth and gain. Will that happen? We doubt it.

SAVE A Job?

I have a **VERY** serious problem!

I have been working for a satellite television company for about three months as a sales representative. I like my job and the company is 'tops' in their field in this area. Everyone I talk with always wants to know about scrambling. My company has said 'not to worry.' But just last night I watched a national television program (**20/20**) and they said that by the middle of 1985 **ALL** of the major transponders (HBO, Showtime, Cinemax, ESPN, Playboy, etc.) will be scrambled. UNTIL I can find some truth about this problem, I am going to stop selling satellite systems.

Who is going to scramble? **When?** How much will the descrambler equipment cost? Will it be readily **available**? If **CSD** cannot answer these questions, do you know who can answer them for me? I would appreciate a reply as soon as possible because my job depends upon it. I cannot bring myself to sell a system that costs \$2,000 and up to unsuspecting consumers if that system is going to be worthless in a few months.

Robert McKenzie
205 Reeds Lane, #29
Everson, Wa 98247

Robert's integrity is to be applauded. Too bad more people do

not have his concern for not misleading the gullible public; on this or any other 'questionable' issue.

Direct and honest answers to direct and concerned questions:

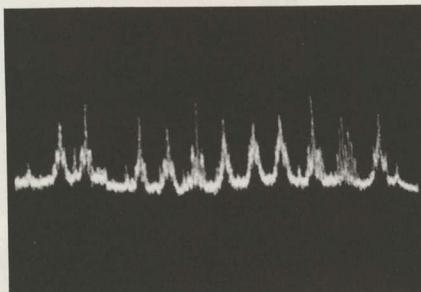
- 1) **Who is going to scramble?** At the moment ONLY HBO west, Cinemax west and Cinemax east are scheduling scrambling prior to September of this fall. HBO east will be the **last** of this group of four and it will not commit to a firm date until (a) they see how the scrambling goes with their first three transponders, and, (b) they decide how, or if, they are going to 'market' their service(s) to individual, home TVRO owners. Showtime, ESPN, Playboy and others are much further down the road at the present time; perhaps no sooner than mid to late 1986.
- 2) **When will scrambling happen?** We just answered that, but understand that even Cinemax west, HBO west and Cinemax east depend upon **all** of this new equipment working **properly**. As we write this and as you read this, those tests are still on-going. HBO had HOPED to have those 3 transponders scrambled **full time** by April 29th. If you check now and see that not all three are full-time scrambled, that will tell you that there have been problems with the equipment or system and even these three transponders may be awhile longer.
- 3) **How much will descrambling cost?** Until HBO or somebody else has announced a firm marketing plan (i.e. a program to sell the services backed up by a schedule of rates), nobody (**not even HBO**) can answer that one. There is no answer to this question, yet.
- 4) **Will it (descrambled service) be readily available?** Another tough question. HBO says they 'hope so' but the very act of attempting to sell such a service directly to home users places them in a grey area of 'law.' **SPACE** says that if HBO does **either of** two things, (1) tries to sell their service **only when** it is combined with other services in a 'bundle,' or, (2) tries to sell their service **ONLY through** their cable TV affiliates (who would 'market' for HBO), they (**SPACE**) will haul HBO before the Department of Justice and into federal court. HBO thinks,

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PSA-35 DISPLAY OF SATCOM 3 VERTICAL

MSA-85

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AVCOM Spectrum Analyzers display all signals coming from LNA's and BDC's to rapidly determine signal strength, inband attenuations, TI, bad connectors and LNA's, poor feedhorn isolation, and lossy cables. Essential to quickly check BDC systems for signal balance and component performance. Other applications include classroom, research and development, production, "debugging", SCPC analysis, and general communication service.

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but cannot be sure, SPACE is bluffing. SPACE makes several good arguments why selling in 'bundles' (forcing people to take **ALL** of the services in the bundle, even if they only want **one** of the services) is not in the best interest of consumers. They make several other good arguments about making the cable affiliates '**exclusive agents**' for these services (in effect allowing

ing cable firms to **deny service** to people who live in a town with cable UNLESS the people with dishes in town ALSO sign up for cable TV service).

These are the current, straightforward, honest answers. And we got through this without ever mentioning M/A-Com one single time!

TRANSPONDER WATCH

RECENT REPORTS OF ACTIVITY ON DOMESTIC / INTERNATIONAL SATELLITES

Send your reports to CSD Transponder Watch, P.O. Box 100858, Ft. Lauderdale, FL 33310. For late news, call (305) 771-0505.

JAPANESE experts have pinpointed cause of failure for **Yuri 2A** satellite which lost two of three high power TWT tubes shortly after launch. 'Micro-discharges' from the high voltage power supplies caused the power supplies to 'switch off' rendering the TWT stages inoperative. French Thomson tubes had been chosen over more-space-proven Telefunken and Hughes tubes because of their light-weight design. **Yuri 2B** is due for launch as a replacement this September. Failure of 2A sent tremors through Japanese TVRO industry and resulted in greatly increased competition in North Amer-

ican 4 GHz market when Japanese domestic market for 12 GHz hardware failed to materialize on schedule.

INTELSAT, admitting rates are too high, has reduced by 15% charges for 'full-time' TV leases on zone and global beam coverage at 4 GHz. Also approved was new 72 MHz bandwidth 'spot beam' service for 11 GHz birds on newer Intelsat V and VA birds. Cable needs in Europe, in particular, will find this service useful.

LATIN American television broadcast interests have not been adequately served by Intelsat according to the Organizacio de Televi-

MICRO SCIENTIFIC LABS, INC.

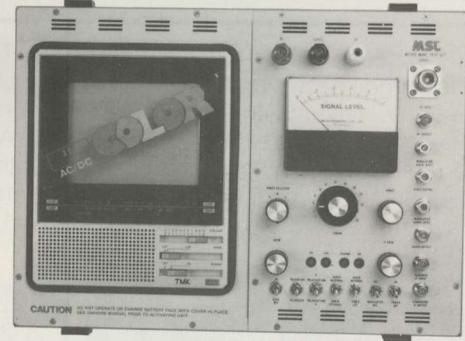
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They are ready to offer their technical knowledge and experience to help you penetrate the growing SMATV market.

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2. Lay out the entire system and give you a set of blueprints for your prospect.
3. Price everything required.
4. Provide comprehensive system installation instructions and answer any questions you may have.

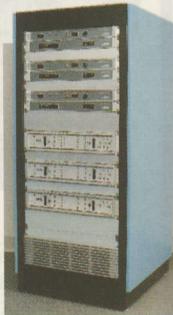
And all this at no additional cost to you.

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GENERAL INSTRUMENT

Southeast **satellite**

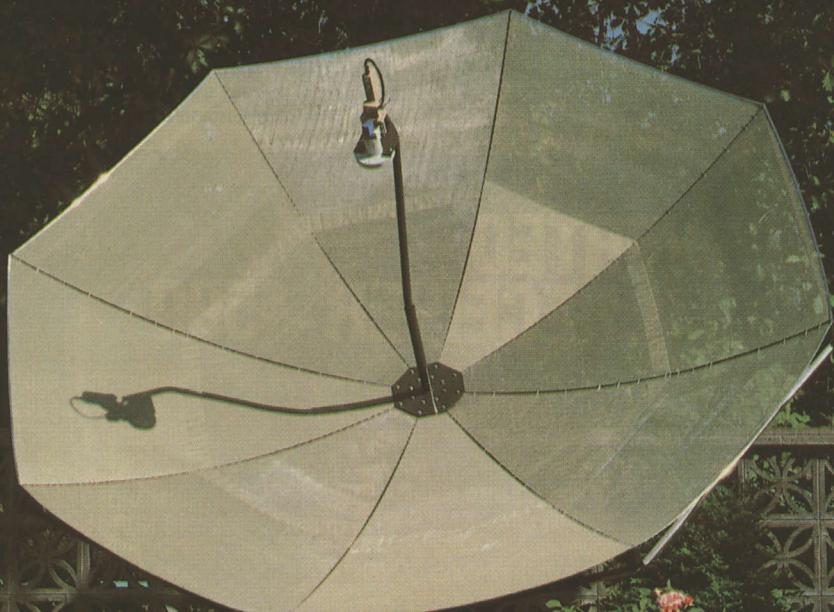
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TRANSPONDER WATCH/ continued from page 71

sion Iberoamericana. The group charges Intelsat with overcharging by 5 to 8 times, and reduced technical quality caused by sending two video signals through a single (half) transponder (format).

FUNDING for satellites may become a problem according to a study by a California firm; they anticipate up to 183 new satellites to be built or started between 1985 and 1990, requiring more than nine billion dollars of investment.

VALUE of all 'international information flow' is estimated at 500 billion dollars for 1985. Figure covers all charges to all parties involved in sending and receiving any form of information (including television) across national borders, worldwide.

FCC wants to charge all applicants for licenses fees to offset overhead of administration. TVROs need no license and would not be involved although cable firms seeking license for TVRO would be charged \$675 for initial license and \$90 for add-on approvals. Microterminal industry, covering high speed data flow using small dishes, could be charged as much as \$1350 for license although some of the terminals sell for as little as \$6,000 each.

SKYCHANNEL, the British operated advertiser supported English language service for cable, reached the 3,000,000 home level in March. Largest concentration of homes is in The Netherlands (1,700,000) and Switzerland (505,000) with other cable and hotel outlets in W. Germany, Norway, UK, Finland, Austria, France and Sweden.

RUSSIAN Intersputnik system may be allowed to interconnect with Intelsat system in future. Russian interest in joining Intelsat as a formal member is reported; membership fee at this stage involves capital investment of approximately \$885,000.

USCI failure was totally predicted by most of industry; the pioneer 12 (11) GHz band five channel service was originally set to close down last December 31st until it found several 'suitors' interested in helping it survive. As much as \$70M was 'wasted' on project that ultimately attracted no more than 11,000 U.S. homes.



FIND THE END/ Star Com's Pat Porter (left), a bit of a magician himself, laughs in disbelief as entertainer at R.L. Drake new-product-party does updated version of the old rope trick. The guy was good; even with frame to frame display of videotape shot by CSD during the act we could not detect how he did it!

FIRST close bird-to-bird spacing problems have appeared; Westar 3 and Galaxy 3 birds are but 2.5 degrees apart and SCPC and data terminal users of Westar 3 are experiencing problems from Galaxy 3. Engineering meetings to define and sort out the interference underway. Most severely impacted are state and national radio network users on transponder 2 of Westar 3.

AVANTEK will begin shipping 1.2 and 1.8 meter **Ku band** transmit and receive terminals in June with transmit power levels of from 2 to 10 watts. The new terminals can handle transmit data speeds from 9.6

BLOCK CONVERTED COMMERCIAL RECEIVER - \$590

Don't let the price tag fool you. The SR-4650P performs as well as the best commercial satellite receivers. No other receiver has more versatility or features. Features like: 950-1450 MHz block IF input, full compatibility with descrambling hardware, compatibility with most LNB's and block converters, 70 MHz loop, AGC

& AFC with defeat switch, frequency agile video & audio, polarizer interface, and 1 3/4" rack spacing. The SR-4650P is a real heavyweight on performance too. For example: no channel drift, channel memory during power losses, ultra wideband linear quadrature detector, 30 MHz IF bandwidth, and needs only -65 dBm signal input.

With all this, and low pricing too, don't fool yourself into paying more and getting less! Call or write for literature.

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kilobits per second up to 1.544 megabits per second and install in around 3 hours time. Prices start at \$15,000 in quantities of 100 terminals per buy.

ARABSAT 1 bird launched by Ariane in February is not without operational flaws. Satellite's 'attitude' or correct pointing status, which insures that it boresights the appropriate target area, is 'drifting' because of apparent failure of internal stabilizing system built around gyroscope.

CITIES are rushing to prepare their comments and defenses against FCC announced intention to pre-empt all local zoning ordinances which unfairly restrict the installation of TVRO or ARO satellite antennas. Also opposing FCC announcement are cable television operators who have been behind many of the restrictive ordinances adopted in recent years.

ITT, giant communications conglomerate, plans fall '85 introduc-



ON THE TRAILERS/ trailer mounted displays still proved to be cost-effective and speedy approach to getting set up in a minimum amount of time.

tion of '40 channel DBS TV receiver' in Europe. Receiver is to be built by Italian subsidiary Industrie Face Standard, will use 3' dish, and is being promoted as 'inexpensive'.

CHINA expects to launch its own home-brewed weather satellite shortly. The receiving equipment to retrieve the weather data is located near Peking and came from US suppliers.

CANADA will collect several million dollars in insurance for its ANIK D2 satellite even though the bird is in storage orbit and is not yet being used. Bird ran away from controllers March 8th and to gain back control a sizeable quantity of station keeping fuel burned through jet thrusters. Bird is not scheduled for active use until 1986, but with loss of fuel, will now have 14 fewer months use due to run-away

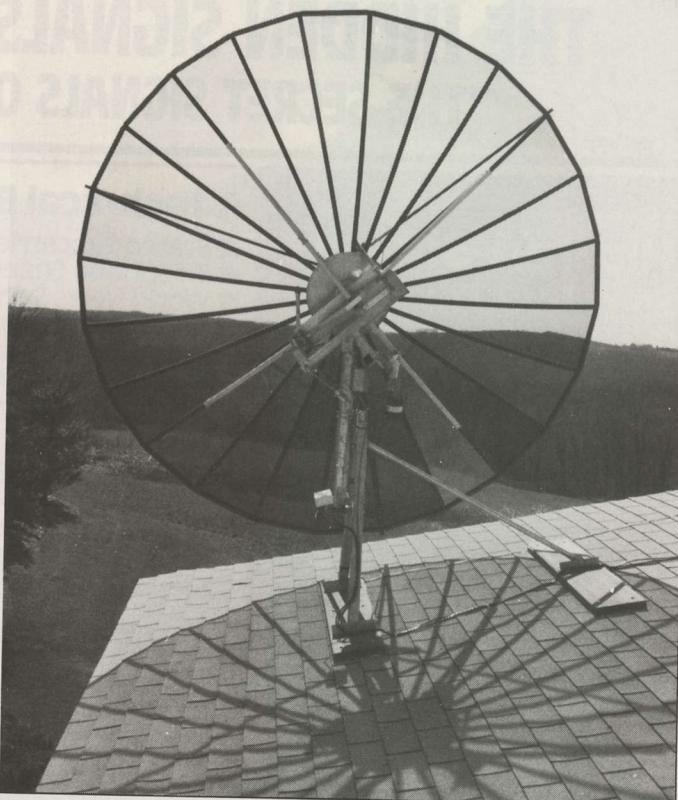
Home on the Roof!

- With over 5,000 installations throughout the country, the lightweight XL10T tripod roof mount by Microsat is quietly becoming an industry standard.
- We have proven how easy a 3 meter antenna can be roof mounted. In fact, because of its light weight — only 80 lbs., it may be easier than ground mounting.
- We have shown the versatility of the tripod roof mount, by mounting dishes on roof peaks or on practically any surface.
- We have proven the XL10T's reliability and performance, with over 3 years of field testing.
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condition.

UK cable and private viewing advocates have been hopeful that Intelsat VA series bird just launched would end up at 1 degree west as replacement for ailing IV-F8 now there. This satellite presently carries AFRTS plus contract ABC and CBS services at C band. New VA series bird will have relatively high power (49 dBw) Ku band capabilities on board and could provide excellent service to dishes in 3 foot class throughout all of UK.

BRITISH regulations towards SMATV and home TVRO also scheduled for early change; present regulations prohibit MATV systems from using satellite signals but new regulations will allow SMATV and possibly home TVROs to operate.

RCA making bid to turn F1R at 139 west into number one 'audio services satellite'. Presently, NBC, ABC, CBS, RKO, CNN (radio) and others are using F1R for distribution of radio network services (mostly using **digital audio** format). RCA recently offered 50 kHz wide SCPC channel for 24 hour per day use at record low price of \$1,750 per month. Radio stations equipped with present digital audio systems (more than 3,000 nationwide) would add splitter and second (SCPC) receiver to add additional non-digital radio network services; typically under \$2,000 per station. RCA is going head-to-head with Western Union which boasts 3 national and 30 regional network radio services, using transponder 2 of Westar 3, at monthly charge approximately 20% higher than RCA offering.

SORTING out current line-up of Atlantic 'path' Intelsat satellites may be made easier with following. 'P' indicates primary satellite, in use by those countries with only 1 satellite antenna; 'MP1' means major path 1 or second choice satellite; 'MP2' means major path 2 or third choice satellite while 'S' means spare (often used for television distribution). 1° W/ under contract to AFRTS and others, 'S' (IV-F8); 18.5° W/MP2' (V-F6); 24.5° W/P' (V-F3); 27.5° W/S' (V-F4); 34.5° W/MP1' (V-F2); 53° W/ under contract to Mexico, 'S' (V-F8). Birds out of service but not jettisoned are also at 31W, 21.5W and 5 west.

BELGIUM authorities have agreed to allow Italy's RAI channel



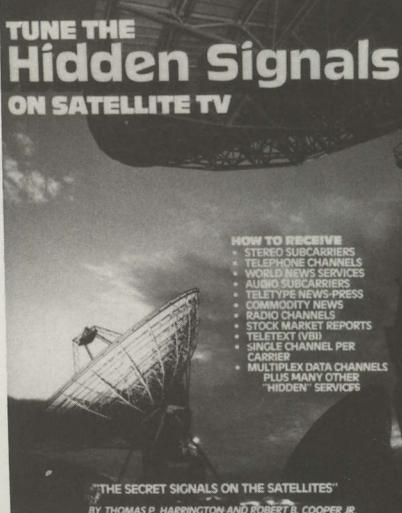
BIG EMPTY tent would be filled with approximately 100 exhibit booth spaces by 10AM Sunday when the show opened. Installers braved 80 mile per hour winds to erect the giant canvass.

carried on Eutelsat to be distributed via cable networks. Belgium cable systems had 'added' RAI on their own without government approval and then were forced to take it off cable pending negotiations.

EGYPT has applied to Eutelsat to receive European television programming at earth station near Cairo. ECS F2 satellite will provide first direct link to Egypt for European television broadcasters, and country would be first outside of European continent to be regular user of programming.

WTBS has begun transmitting in stereo. Station started with stereo coverage of Braves home baseball games (April 12th) and will

THE HIDDEN SIGNALS ON SATELLITE TV "THE SECRET SIGNALS ON THE BIRDS"



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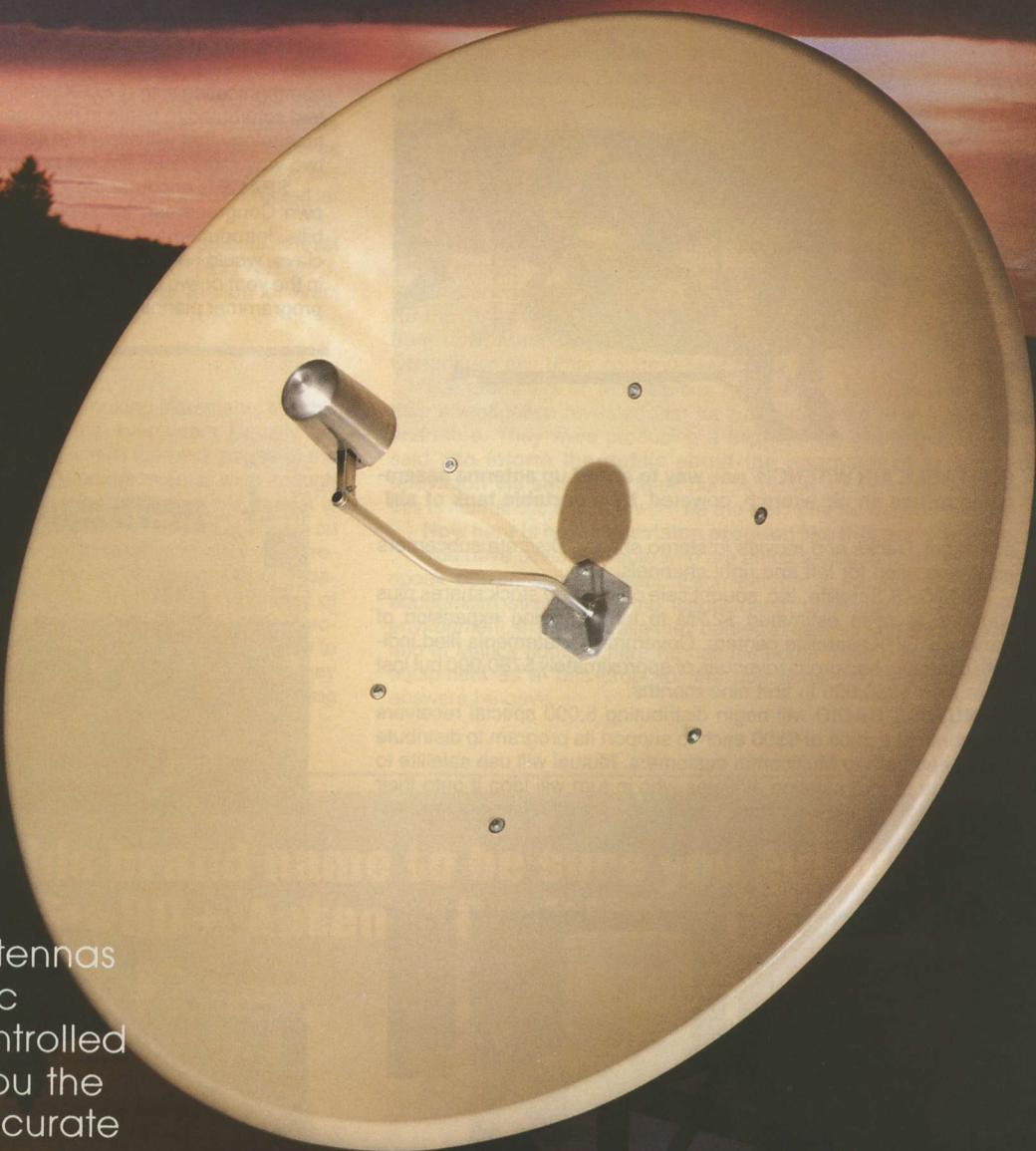
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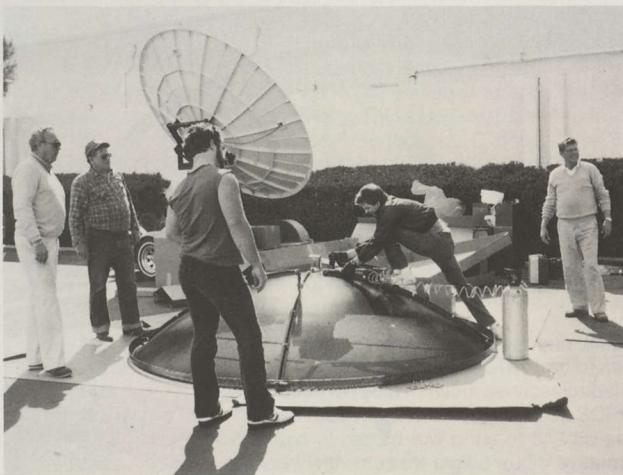


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add Night Tracks and movies in stereo shortly. Discrete subcarriers are being used for left and right channels.

BROOKS Satellite, Inc. sought sale of 500,000 stock shares plus warrants to raise estimated \$2.7M to fund ongoing expansion of franchise TVRO satellite centers. Government statements filed indicate company had gross revenues of approximately \$780,000 but lost more than \$350,000 in first nine months.

MUTUAL RADIO will begin distributing 5,000 special receivers per month at a price of \$500 each to support its program to distribute mid-speed data to Multicomm customers. Mutual will use satellite to send data to radio station affiliates who in turn will loop it onto their (FM) sub-carriers. The special receivers, with attached printers, will

handle data up to 9.6 kilobits per second. Mutual will use Westar 4 as a satellite link.

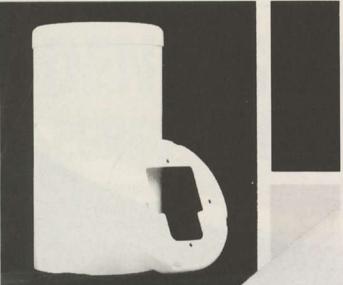
ATS-3 still alive and apparently well at 105 west after 17 years of service, will get one more shot. Federal Express plans to use VHF relay capability of ATS-3 (149.179 to 149.265 MHz) to test feasibility of communicating with (FED-X) delivery vans operating in rural areas in test scheduled to begin in next month. Federal Express is looking for technology that will allow it to service rural areas where conventional two-way radio links are not practical.

SPACE is encouraging TVRO dealers and owners to petition their own Congreeemen for support for **HR1769** and **HR1840**. The two bills, introduced to Congress just prior to recent SPACE/STTI conclave, would help determine the direction of scrambled programming in the year or two ahead. **HR1769** would place a two year 'hold' on any programmer planning to scramble, to allow marketplace mechanisms



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BIG RIGS/ in the "battle of the semi's" **M/A-Com** was the clear winner with a 40 foot long billboard display that doubled as an equipment hauling device.

to come into place thereby insuring home TVRO viewers of access to scrambled programming. **HR1840** would establish guidelines for the mandatory sale of scrambled programming to home TVRO viewers bringing the FCC into the act if reasonable pricing and access was not possible with marketplace elements at work (see **CSD/2**, April 15th).

RCA AMERICOM wants to turn their 1986 launch of Ku band bird into programming exchange system for television syndicators. RCA offers 5 year lease for 1/2 transponder, 4 hours per day, to syndicators for \$2M and claims TV stations can receive up to four separate (syndicated) programs simultaneously via system. 12 foot dishes, supplied through M/A-Com, are part of the package to broadcasters.

TURNER received FCC green light to build Intelsat grade 'international uplink' in Atlanta. The \$615,000 system will include capability of directly connecting Turner's complex with Europe through 'cross strapping' within satellite from C band to Ku band. CNN is scheduled to begin delivery into Europe in mid-September via Ku band.

FRENCH TELECOM 1A, now operational from 8 degrees west, will be joined by 1B bird at 5 east shortly; launch was scheduled for late April. 1A bird has had problems with military 7/8 GHz package as traveling wave tube amplifiers have shut down without warning because of static electrical discharges. Problem is reported corrected for newer 1B bird.

LAUNCH of first Mexican domestic satellite now off until at least first week in June. On same mission, Arabsat 2 and (AT&T) Telestar 3. The AT&T bird will be at 128.5 west if FCC approves, to allow for direct change-over of D4 traffic.

COOP/ continued from page 5

Now old Honest Box Office has been making statements like this to small groups of people for some months, even years. Usually this sort of statement does not even rate a line in the back pages of the newspaper because the journalist covering the event is wise enough to check on the story and he or she then learns that what 'old Honest' is **really saying** is that a handful, maybe six or eight, of the channels on satellite may be 'black' (as in scrambled) sometime within the foreseeable future. I usually like it when **Ed Horowitz** or some other wide-mouth at 'old-Honest' says something like this; the sheer lunacy of such a statement instantly throws suspicion on **EVERYTHING** Horowitz says. People who exaggerate like this are the easiest people to engage in debate because they wound themselves the first time they open their mouths, and from that point forward they just keep on losing

blood all over the stage.

But the CBC folks at 'Marketplace' committed that great sin of all sins in journalism; they not only 'bought' the statement that 'the sky is going black,' they amplified on it! Here is how that happened.

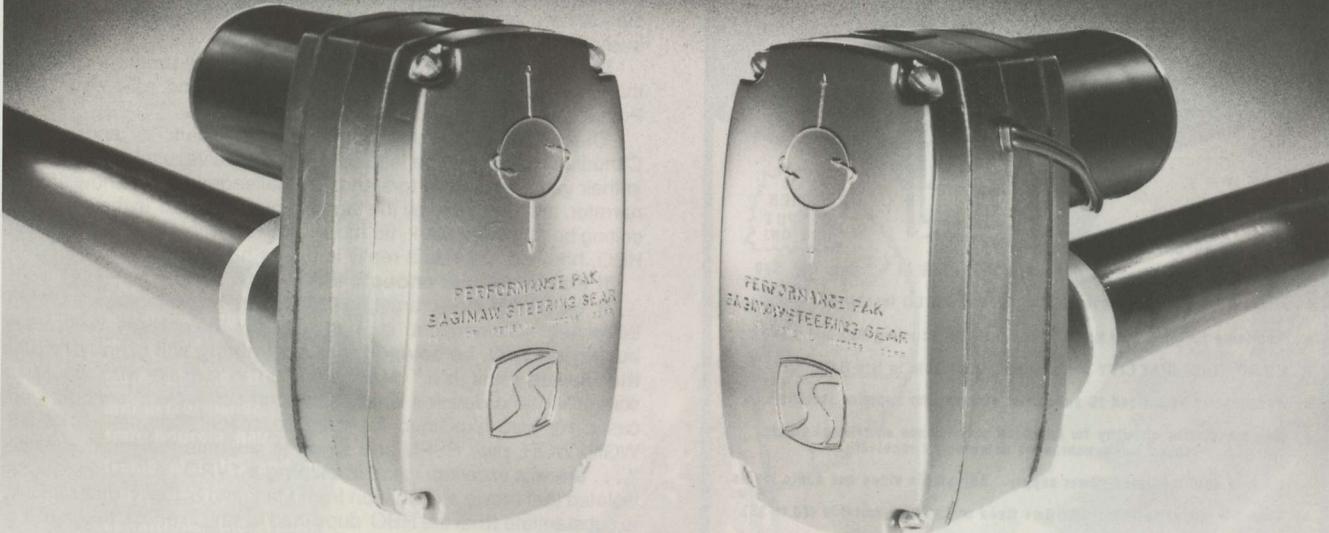
CSD's Canadian Bureau Chief **Mark Lewis** is the most knowledgeable person in Canada on the subject of satellites, satellite law, broadcast law, and satellite equipment. There are brighter engineers and there are brighter lawyers than Mark, but nobody has the thorough background of Mark Lewis that allows him to respond on virtually any subject involving satellite TV. Lewis is an attorney, something I admit usually makes a person suspect, but before he was an attorney he was a youngster engaging in the wild art of 'TV DX' or long distance TV reception. This background uniquely qualified Mark to write and administer communications law in Canada on both sides of the fence; **for** the government, and, **against** the government. Someday, years from now, Mark will make the best 'Minister of Communications' Canada (or any other country) ever had.

The producers of 'Marketplace' sought out Mark Lewis because their investigation revealed that he was everything I have just said, and more. They were producing a segment on 'Marketplace,' they said, "**to inform the public about the approach of scrambled television via satellite.**" Mark handles such assignments well and this is neither the first, nor will it be the last, time he was 'on camera.'

Now here is how a television program like this goes together.

You have several people who are being asked to comment on or speak out on some subject. Each person is routinely 'filmed' (a euphemism since film is no longer used; only tape) in their own environment. In Mark's case they hauled in camera and audio people and in Mark's home, where he has his home TVRO, they used his equipment as a 'backdrop' for the questions they asked and the answers he gave.

Look for this brand name to be sure you get our Hi Tec 90+® Antenna Positioners



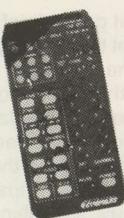
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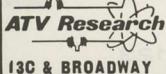
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The same technique would be used with each person appearing on the segment. Then when all of the segments are 'in the can,' the producer of the segment retires to his editing studio and he reviews everything said by each person interviewed. As he reviews the **total amount of information** before him (or her), a 'natural story' evolves. One person said 'the sky is black' and another person says something which substantiates that yes, indeed, the sky is black. The producer calls in a writer and they create a 'continuity script' which the 'host' on the segment will then sit down and record into a camera. This 'continuity' piece consists of the entire story from start to finish with pauses built into the script where the producers will then 'insert' the comments they have earmarked for use from the field taping down in places such as Mark's living room.

Then the producer goes back to the editing booth, and with an electronic editor, he starts 'laying in' the comments from the various pieces of tape shot at 'old Honest Box Office,' Mark's living room and so on. When he gets done, the original continuity script which featured only the 'narrator' or field reporter (who may have never actually gone into the field at all) is a complete story. He starts by explaining the premise or problem, and then moves swiftly from one comment (HBO) to another (Mark Lewis) and back and forth until he comes to his 'logical conclusion.'

This is basically how **'Sixty Minutes'** puts together its pieces and the technique is pretty basic in television journalism these days.

The HBO person said, without equivocation, "**The sky will go black.**" And he hung a date on it; "**... within sixty days.**" The HBO person was telling Canadians several things, including:

- American satellite television is going scrambled; **all of it.**
- Canadians who have been watching American satellite television all of these years have been hooked on a forbidden fruit which is about to become extinct.
- No Canadian will be able to 'eat this fruit' after 'the sky goes black' because HBO (and others) will not, or are not allowed to, sell their services in Canada.

Now, let's "cut" back to Mark Lewis and his living room segment. There Mark has explained to the camera the full range of satellite signals. He has carefully explained scrambling, and has shown the Oak Orion descrambler system in operation (see **CSD/2 for March 15th** for a report). So Mark, too, has addressed the scrambling premise and he has made it clear to the camera that '**some channels will be scrambled**' and that '**already there are eight Cancom** (Canadian created) **channels scrambled.**' He has also explained how Cancom markets the service and has explained that the descramblers are available in Canada.

Back to the editing room. The producer of the program comes to this segment of the interview with Mark ... and rolls right by it. Probably in 'fast forward.' **None of it airs at all.**

The HBO statement that "... the sky will go dark ..." and that "... Canadian viewers will be left with very expensive, useless bird baths in their yard" is allowed to stand. Unchallenged by the show piece's narrator, and unrefuted by the tape the producer had 'in the can' in his editing booth where Mark, far more knowledgeable than the guy from HBO, had laid it out as it really is and is happening.

If that is not bad enough, follow this.

In explaining the scrambling scenario as he understands it, Mark Lewis had explained that "... if movies are the only reason you are buying a TVRO, be advised that scrambling will greatly reduce the movies available." Mark went on to explain who would be scrambling and detailed what each such scrambled service broadcasts. He also explained the many excellent features on WTBS, WGN, WOR, plus ESPN and so on to illustrate that movies aside, "... there is excellent value in owning a TVRO ...". The producer isolated that movie explanation from Mark and actually 'dropped it in' to substantiate what the HBO 'dupe' had to say. In effect, **taken out of context**, Mark's words were used to make **HBO appear** as if they were correct in their wild-eyed statements.

"The sky is falling, the sky is falling" according to old 'Honest Box Office' now reads "The sky is turning black, the sky is turning black." There's a nut loose at HBO running around in a chicken suit.

Why would a prominent program producer, working on an established and highly responsible television program such as 'Marketplace,' be duped in this manner? I'd like to strike up the colors and

defend him since after a fashion he is a journalist by avocation. But I will be damned if I can bring myself to do that when this guy sat there with rolls of 3/4" tape shot in Mark's living room **which told the straight story**. I'd suspect they lost all of the tape shot in Mark's home had they not conveniently 'found' the pieces they did air; which were skillfully woven into the fabric of the HBO spokesperson's statements to make HBO appear even more sincere and knowledgeable.

'Marketplace' is probably not the best viewed program in Canada. This particular piece was heavily promoted ahead of time and as Mark Lewis observes "If the number of people I have spoken to and the number of telephone calls received was an indicator of 'ratings,' then surely 'Marketplace' must be ahead of 'Dynasty' in terms of ratings!"

You can guess what happened after this segment did air. **Satellite television sales went to hell-in-a-hand-basket the very next business day.** People exposed to the CBC report **believed** what they saw and what they heard. We are talking 'serious disruption' in the marketplace here; not some minor dip caused by a bad cold front. This was **'the big chill'!**

Lewis, a professional in every respect, was devastated. As he would later pen to **Nigel Sims** at 'Marketplace,' "As a long-time broadcaster, I am always concerned about my comments being taken out of context." Mark had been promised by the segment producer that the entire piece would be 'balanced'; that is, the viewer would switch away with a clear understanding of the issues, if not the answers. Alas that was not to be.

So how do you coerce a producer on a program such as 'Marketplace' to cross over the line of responsible journalism and become a 'hired dupe' for 'old Honest Box Office'? **Money perhaps.** A promise of a free descrambler for the producer's home TVRO, **perhaps?** How about promising him a shot at 'the big time'; the chance to 'produce



LEWIS appearing on 'Marketplace' on CBC in Canada; 'Old Honest Box Office' strikes again?

something for HBO! Speculation of course; maybe the guy doing this one is just plain not qualified to be doing what he is entrusted to do. **to** **CBC** is Canadian television. Canadian in the sense that it is the official government voice of broadcasting. It carries more weight, within Canada, than say 'Sixty Minutes' in the states. And we all know what mountains 'Sixty Minutes' has moved through the years. And I do 'Sixty Minutes' an injustice to even mention 'Marketplace' in the same

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sentence or paragraph.

We cannot undo the harm done by 'Marketplace.' The best we can hope for is a retraction. Unfortunately, that will not right what was done and Canadian TVRO sales will suffer for months now because of this bit of irresponsible journalism.

I feel very sorry for Canadian OEMs, for Canadian distributors such as Cale Communications, and most of all for the Canadian TVRO dealer who is at best ill-equipped to answer this sort of program. The losers here are the Canadian public who would have bought a TVRO had they not been scared off by 'Marketplace.' Just think; had they had a TVRO at the time when 'Marketplace' aired this piece, they probably would have been watching WTBS at that time and they would have never been exposed to the self-serving rantings of 'old Honest Box Office.'

CANADA IS A Dumping Ground

If the Canadian 4 GHz industry was not having enough problems caused by the interloping of HBO, now they have a new one; Canadians being encouraged to purchase for the modest sum of \$1,099 a complete Ku band package which openly tells the consumer that he can have ESPN, music videos, 'adult only programming' and much more.

I understand that 30,000 of these Ku band systems are being 'dumped' in Canada because of the failure of USCI to make the grade in the United States. This is not the first, nor will it be the last, 'fire sale on TVRO systems' but it comes at a terrible time for Canadians.

Worse than the dumping of the systems is the imminent failure of the USCI service which these lightweight dish packages are supposed to receive. Everyone buying one of these systems will be stuck with a real piece of useless electronic memorabilia when USCI closes down. (*)

Of course it might be that these dish systems could be used on NBC from SBS: except that the audio tuning system on these packages, I understand, is 'fixed' so the unusual NBC audio sub-carriers will not be tuneable. Well, maybe the people can learn to read Jane Pauley's lips.

These are General Instrument systems and while some of the dishes are fiberglass, others are spun metal. The advertisement doesn't tell you what you are getting; it deals with the usual hype of what you 'will get' but it avoids mentioning the possibility or reality that the USCI service (which they do not name in the advertisement) is at best playing on numbered days.

I can't blame GI for wanting to dump the hardware; I'm sure they have nothing to do with the distribution of the packages nor the action of the retailers in this situation. Sales, in March, were reported as 'brisk' but that was a couple of months back.

So here we have the Canadian marketplace **first** being ripped apart by the CBC television program 'Marketplace,' which all but destroyed the sale of 4 GHz dishes, **and then** we have this dumping of 12 GHz units for a Ku band service which even the sellers of the equipment had to realize was on very shaky ground. **The public?** Hell-fire, they get taken again and it may be years before the average Canadian even thinks seriously about investing in ANY kind of satellite TV system.

Oh yes; GI had an ownership stake in USCI at one point. They got that to help them have an 'inside track' on selling hardware to the system. USCI ended up with around 11,000 paying subscribers at their peak but by failing to install a scrambling system they left them-

*/Oops! USCI did close down and guess what these people can do with these 'bargain systems' now!



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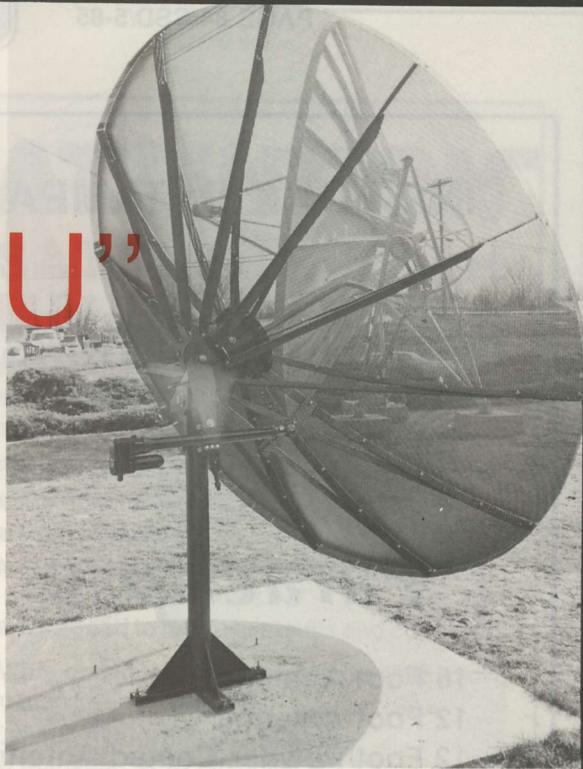
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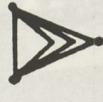
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selves in a terrible spot when it came time for the customer to 'renew' for year two. The customer could simply tell them 'no thank you' and then go on watching USCI anyhow. And USCI couldn't do a thing about it since the customer owned the terminal. And the Canadians buying their own terminals? They were, of course, 'pirating' USCI in Canada since they were receiving the service without paying for it. Can you believe they spent more than **\$70,000,000** on USCI before throwing in the sponge?????

SHOW Recovery

As we reported in **CSD/2** for April 15th, the recent Las Vegas show broke every possible 'industry record' for number in attendance, number of booths, and number of antennas. The only thing we didn't measure was the number of Cokes consumed in front of the **STV Magazine** booth by left handed Armenians from South Texas. The show was a winner.

Just ahead is the Tulsa show; June 21 to 24. And not far behind is the Nashville show over the (American) Labor Day weekend. Yes, we have a 12 month year but a six month show year. Most of us need that 'other' six months to answer our mail, produce our products and convince our families that we still love them.

Coming off of Las Vegas there were very few negative comments from those I spoke with. The show managed by **Rick Schneringer** was exceedingly well run and there was a very pungent statement from Rick and **Gloria Schneringer** as they leisurely strolled the aisleways of the exhibit hall just 15 minutes before the opening bell on day-one surveying their domain. This was a relaxed, confident couple who seemed not to be bothered nor concerned by the 15,000 people clamoring just behind the locked doors for admission to the exhibit halls.

There are several constructive suggestions floating about for better shows in the future. I'll share a few of these with you:

- A) Four days.** The industry has gotten too large for any really interested attendee to tour and absorb data from the 600 to 700 booths in a three day period. This is especially true when you factor in the ever growing list of seminars and training sessions and 'meetings' which take a person away from the exhibit hall. Most people still attend shows primarily to look at exhibits and perhaps one solution would be expanding the show period to four days but setting one day (such as number two) aside for ONLY exhibits, plus the SPACE banquet.
- B) Extra set up day.** Naturally the host convention center or hotel charges so much per-day for the use of their facility. And each day that we use the facility, whether for actual show or preparing to show, costs bucks. However, the booths have become so ornate and elaborate and there is such a crush of men and materials during setup that we really need two full days to 'create' the exhibit hall. The 30 to 36 hour period in Las Vegas proved to be a tough problem for many exhibitors.
- C) Extra tear down time.** The reasoning here is the same; if it takes two full days to set up, it takes no less than one **full** (24 hour) **day** to tear down. Again, the problems are doubled and tripled by the tremendous number of packing crates and shipping tools which must be run into the narrow aisleways immediately at the close of the show so that each supplier has his crates available to tear-down-into!
- D) New comers.** It has been suggested that those people who are attending their first show, as would-be-dealers, would profit greatly if they knew **something** (anything!) before they crashed into the exhibit hall. How many times should a Chapparral salesman have to explain that a downconverter is a part of a receiver or that most satellites have two polarizations and something has to select which polarization the customer will view? Suppose that first-timers were **somewhat** (we only make the suggestions, we don't provide the answers!) **required to attend** a one-day quick cram-course in basic-satellite-communications before they were allowed onto the exhibit floor? Well, it sounds like a good idea when you say it fast.

An alternate plan would be to color code the badges for 'first-timers' so that they would 'stand out' in the exhibit hall. This would be an immense help to booth personnel since they could glance at a guy's (or gal's) badge and instantly know whether they had to start off with the basic pitch or move on to the graduate pitch.

Our problems, here, are all sharing one common element; **time**. We need **more time** to be productive, to do what we went to a show to do. Either we add more time to the shows, or, we try to make better use of the time available. A little more planning, as soon as Tulsa, would be of immense help to those who have to 'work' the shows.

VC2 Fallout

I admit it; I did a terrible, dirty trick. But I felt it was totally justified under the circumstances.

Industry reaction to our three-part videotape report on '**The Great Scrambling Myth**' was virtually totally supportive. First shown in Las Vegas to the SPACE Dealer Board, that board promptly voted that it should be shown to the 'SPACE Scrambling Rally' scheduled for Monday the 1st. I suggested that we cut it down and show only parts two and three (which ran to some 21 minutes) just so we didn't put people to sleep with all three parts. Next it was shown privately to a number of members of the SPACE 'Big Board' and when the show actually opened on Sunday morning we began showing it each hour, on the hour, in our booth. There was barely room here for 15 to 20 people to view the 34 minute three parter and each time it ran we had a standing room only audience. I lost track of how many times it ran but looking back, it had to be at least 20 times. Subsequent to the show, it ran on **Boresight** on April 4, 11 and 18.

At the Las Vegas airport Saturday morning before the show opened to pick up a CSD consultant, I bumped into M/A-Com's **George Bell**. George and I have been friends since 1975 or so when we both got started in the cable-satellite business. George is one of those rare individuals who values personal integrity more than corpo-

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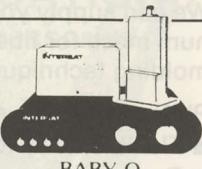
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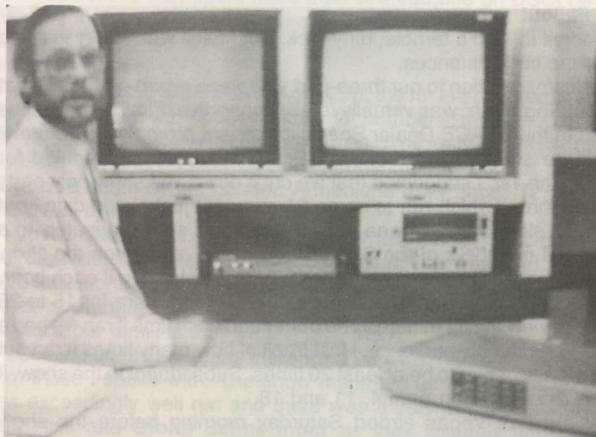
GEORGE BELL is now in charge of the Cable/Home Group at M/A-Com and responsible for straightening out past problems for TVRO program. (Photo courtesy WIV-TV)

rate fluff so I told him about the tape and suggested that he send somebody over to pick up a copy so that M/A-Com could view it **before** the show opened. They did.

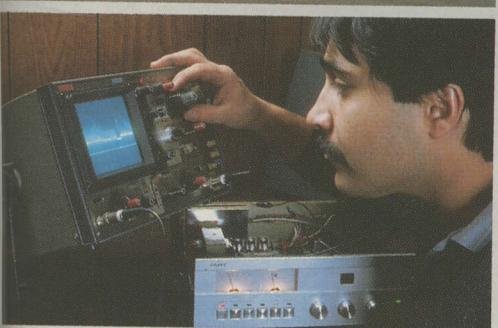
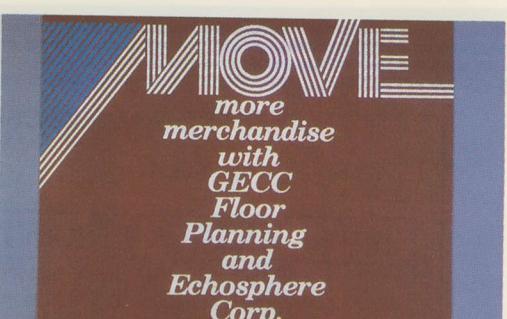
On Sunday, **Doctor Mark Medress**, the man at M/A-Com's Linkabit group who has 'fathered' the scrambling system into operation, dropped by to chat with me in the CSD booth. He suggested I would be 'better informed' if I took the time to drop by their M/A-Com booth where they had an operating demonstration of the system. I promised I would.

Now the dirty trick part.

Just prior to the Las Vegas show, M/A-Com had arranged to invite around 30 separate receiver supplier people to La Jolla, California to participate in a two-day seminar relating to Linkabit scrambling. Day one, March 28, was a general 'This is what it is' session featuring people from M/A-Com such as **James F. Bunker** (Senior Vice President), **Dr. Mark F. Medress** (Assistant VP at Linkabit), **Dr. Woo Paik** (Director of Engineering at Linkabit) and **J. Lawrence Dunham** (VP of Planning and Business Development at M/A-Com). Invited attendees learned how the full system works, the two formats in which the descrambler would be available, and what would be expected of the receiver OEMs in the way of receiver 'interfacing compatibility' for either of the two equipment formats. One format, the VC2000E, is a stand alone outboard unit which M/A-Com would later characterize as



DR. MARK MEDRESS, Assistant Vice President of Linkabit is the front-runner for the package on behalf of M/A-Com. (Photo courtesy WIV-TV)



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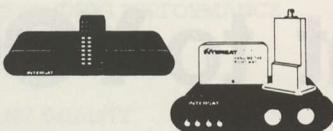
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best for low end, unsophisticated TVRO receivers' while the other is the so-called 'IRD' unit which is dubbed the VC2000M. This one is supposed to pack into a receiver by sliding into an opening or slot which the receiver OEM provides.

Day two, March 29th, was set aside so that representatives from receiver firms could meet privately with engineers at Linkabit to learn how their specific receivers had 'graded' in testing done by Linkabit. The idea here was that Linkabit would give the receiver OEM engineers 'advice' on how the specific receivers needed to be 'more compatible' with the Linkabit package. Those who saw our three-part videotape in Vegas, or on **Boresight**, already know that 'electrical compatibility' is not quite the big thing we had been led to believe previously. There are other 'compatibility problems' however and we begin to address some of them in Part-One of a multiple part report by **Alli Lake** in this issue (see page 34).

Well, when I learned of the two-day seminar, I naturally felt that since **CSD** was already up to its elbows in evaluating TVRO receivers against Linkabit descramblers we should have a person there. Alas, you had to be associated with a receiver supplier to attend. Hummm.

So I called **John Ramsey** at Sat Tec and asked him if he was going. He thought he might. Each firm could bring up to three people; "Would (John) mind if I sent along an engineer who would 'pretend' he was part of the Sat-Tec team"? And so Alli Lake became a temporary employee of Sat Tec and as it would turn out, John Ramsey could not attend so he was the 'only' representative of Sat Tec on hand.

Those who have seen Alli on television, or have talked with him in person, already recognize how bright he is. I had warned Alli, in a fatherly sort of way, that as soon as the 'tape broke' he would have more job offers than he could count. He is very happy working for **Frank Abruzzo** at Fort Lauderdale's "Satellite Link", by the way, and those who are trying to coerce him to leave Abruzzo can quit trying. And sure enough, just minutes after the Space Dealer Board saw the tape (the first exposure) Alli had two job offers. Maybe Frank will give him a raise.

Alli soaked up information in La Jolla. I've talked with some of the best industry engineers we have, such as **Bob Luly** who also attended, and found nobody who got even half as much out of the sessions as Alli. When Alli arrived in Vegas I locked him up in an unlisted hotel room and proceeded with the debriefing. He would within 12 hours turn in an eight page, single spaced, typed report along with the reams of data which Linkabit supplied. Then we went to the **Boresight** set and proceeded to do some TV taping of Alli's impressions while they were still fresh in his mind.

Alli spent most of the three day show talking with people about Linkabit; he accompanied me and our television camera to the M/A-Com booth, for example, where we got a quick private tour of Linkabit.

Through all of this, only two people thought we (or I) had gone off track. A few, such as SPACE Counsel **Rick Brown**, suggested that we ". . . never do things half way . . .". One of the two was a highly placed person at M/A-Com. I understood his feelings, **his job is on the line**. The second one surprised me. **Howard Shippey**, the 'Managing Editor' for **Satellite Dealer Magazine** wanted to know "Why do you have a vendetta for M/A-Com?". He seemed convinced that I run about the world selecting targets to crucify. I ticked off all of the things I felt M/A-Com has done incorrectly on this one and asked him whether he could condone their actions. When I got to the mailing M/A-Com funded last November telling dealers 'Only M/A-Com T1 and H1 receivers are Linkabit compatible' and he offered that he thought "There was nothing wrong with that; they were just trying to sell receivers", I knew I was not about to change Shippey's mind. It will be interesting to see how **Satellite Dealer** reports on the 'scrambling events' in Las Vegas given his peculiar bias towards M/A-Com. And I wonder how many dealers would agree with Shippey that "M/A-Com was just trying to sell receivers . . ." with that infamous mailing last fall.

Well, I have Alli back on the road again. At the moment he is the most experienced engineer in this field, outside of M/A-Com and he is certainly the only unbiased guy out there digging up information about how the Linkabit system will eventually impact on all of us. Alli is not a journalist and I don't want to change his line of work. But over the next few months, through these pages and the pages of **CSD/2**, we'll keep up a running report to you on this most important of all issues for 1985.



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